BY ORDER OF THE SECRETARY OF THE AIR FORCE

AIR FORCE INSTRUCTION 11-2C-130, VOLUME 3

1 APRIL 2000

Flying Operations

C-130 OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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OPR: HQ AMC/DOV (Maj Baxter Swift)
Supersedes MCR 55-130V1 15 April 1993 and MCR 55-130V2,

Certified by: HQ USAF/XOO (Maj Gen Michael S. Kudlacz)
Pages: 432
Distribution: F

This volume implements AFPD 11-2, *Aircraft Rules and Procedures*. It establishes policy for the operation of C-130 (includes 109 AW (ANG) LC-130 and 403 AW (AFRC) WC-130) aircraft to safely and successfully accomplish their worldwide missions. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force. This instruction applies to Air National Guard (ANG) and Air Force Reserve (AFRC) units.

The Privacy Act of 1974 applies to certain information gathered pursuant to this instruction. The Privacy Act System Number F011 AF XO A, Air Force Operations Resource Management System (AFORMS) covers required information. The Paperwork Reduction Act of 1974 as amended in 1996 affects this instruction. Maintain and dispose of records created as a result of processes prescribed in this publication in accordance with AFM 37-139, *Records Disposition Schedule*.

This document is new and must be completely reviewed. This instruction contains references to the following field (subordinate level) publications and forms which, until converted to departmental level publications and forms, may be obtained from the respective MAJCOM publication office:

Publications: AMCI 21-201, AMCI 24-101, AMCR 3-2V2 (S), AMCPAM 55-15, 19, 45 and 46 (AMC).

Forms: AMC Form 41, 43, 54, 97, 148, 196, and 423 (AMC).

SUPPORTING INSTRUCTIONS

AFI 11-2C-130V3 AA, C-130 *Aircraft Configuration and Mission Planning*

AFI 11-2C-130V3CL-1, *Briefing Guides and Checklists*

AFI 11-2C-130V3CL-2, *Loadmaster Briefing Guides and Checklist*

AFI 11-2C-130V3CL-3, *Cockpit Crew Tactical Airdrop Checklist*

AFI 11-2C-130V3CL-4, *Loadmaster Tactical Airdrop Checklist*

AFI 11-2C-130V3CL-5, *Navigator Checklist*

AFI 11-2C-130V3CL-6, *NVG Flight Crew Checklist*

AFI 11-2C-130V3CL-7, *NVG Cockpit Crew Airland Checklist*

AFI 11-2C-130V3CL-8, *NVG Loadmaster Airland Checklist*

AFI 11-2C-130V3CL-9, *Cockpit Crew MAFFS Checklist*

AFI 11-2C-130V3CL-10, *Loadmaster MAFFS Checklist*

AFI 11-2C-130V3CL-11, *Navigator's Grid Checklist*

AFI 11-2C-130V3CL-12, *Search and Rescue Checklist*

AFI 11-2C-130V3CL-13, *Aeromedical Evacuation Crew (AEC) Checklist*

AFI 11-2C-130V3CL-14, *Preflight and Postflight AE Checklist*

Chapter 1

GENERAL INFORMATION

1.1. General.

1.1.1. This instruction applies to Air Force C-130 aircrews and all management levels concerned with operation of the C-130E, H, and KH model MDS aircraft. It is a compilation of information from aircraft flight manuals, flight information publications (FLIP), and Air Force directives, as well as an original source document for many mobility areas. When specified as the reference, the source directive has precedence in the case of any conflicts, revisions, and matters of interpretation. For those areas where this AFI is the source document, waiver authority is according to paragraph **1.4.**. For those areas where this AFI repeats information contained in other source documents, waiver authority will be in accordance with these source documents.

1.1.2. This AFI will be used by all units and agencies involved in or supporting C-130 operations. Copies will be current and available to planning staffs from headquarters to aircrew level. Maintain a copy of this AFI at mobility transportation and base operations passenger manifesting agencies.

1.2. Applicability. This AFI is applicable to all individuals and units operating the C-130 aircraft. Copies should be available to all aircrew members operating the C-130.

1.3. Key Words Explained.

1.3.1. "Will" and "Shall" indicate a mandatory requirement.

1.3.2. "Should" is normally used to indicate a preferred, but not mandatory, method of accomplishment.

1.3.3. "May" indicates an acceptable or suggested means of accomplishment.

1.3.4. "Note" indicates operating procedures, techniques, etc. that are considered essential to emphasize.

1.3.5. "Warning" indicates operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.

1.3.6. "Caution" indicates operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

1.4. Deviations and Waivers. Do not deviate from the policies and guidance in this AFI, except for safety, or when necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required. The aircraft commander is the ultimate authority and is responsible for the course-of-action to be taken. Report deviations or exception without waiver through channels to MAJCOM Stan/Eval function who, in turn, should notify the OPR (lead command) for follow-on action, if necessary.

1.4.1. Unless otherwise directed in this AFI, waiver authority for the contents of this document is MAJCOM/DO. MAJCOM/DO staff should forward a copy of approved waivers to the OPR (lead command). Request for a long-term (permanent) waiver must be approved by MAJCOM/DO and listed in MAJCOM supplement (see paragraph **1.5.**).

1.4.2. Short-notice waiver requests for missions (including missions under TACC operational control) use **Chapter 4**, Waiver Protocol.

1.5. Supplements. This document is a basic directive. Each user MAJCOM or operational theater may supplement this AFI according to AFPD 11-2, *Aircraft Rules and Procedures*. These supplements will not duplicate, alter, amend, or be less restrictive than the provisions of this AFI or the appropriate C-130 flight manual. MAJCOM/DO may initiate a long-term waiver to basic document. When approved, specify long-term waiver approval authority, date, and expiration date in the appropriate MAJCOM supplement.

1.5.1. Combined Operations. Use only the basic AFI for planning or operations involving forces from lead and user commands. Commanders may use approved MAJCOM supplement procedures with assigned and/or chopped forces provided these forces receive appropriate training, and duration is specified. Commanders should not assume or expect aircrews from another command to perform MAJCOM-specific procedures in their supplements unless these provisions are met. Questions by aircrew, planners, and staff contact OPR 24-hours via TACC waiver and technical support services (see **Chapter 4**).

1.5.2. Coordination Process. Forward MAJCOM approved supplements (with attached Air Force Form 673) to HQ AMC/DOV, 402 Scott Dr, Unit 3A1, Scott AFB IL, 62225-5302. HQ AMC/DOV will provide a recommendation to HQ AMC/DO and forward to HQ AFFSA/XOF for approval.

1.5.3. Local Procedures Coordination Process. Units will send one copy of **Chapter 10** (local procedures) to the appropriate NAF (if applicable) for coordination and approval. The NAF will then forward the copy to the parent MAJCOM Stan/Eval function for validation.

1.6. Requisition and Distribution Procedures. Unit commanders provide copies for all aircrew members and associated support personnel.

1.7. Improvement Recommendations. Send comments and suggested improvements to this instruction on AF Form 847, **Recommendation for Change of Publication**, through channels to HQ AMC/DOV, 402 Scott Drive Unit 3A1, Scott AFB IL, 62225-5302, according to AFI 11-215, *Flight Manual Procedures* and the appropriate MAJCOM Supplement.

1.8. Definitions. The explanation or definition of terms and abbreviations commonly used in the aviation community can be found in FAR (Federal Aviation Regulation) Part 1; DOD Flip General Planning, Chapter 2; and Joint Pub 1-02, *The DOD Dictionary of Military and Associated Terms.* See **Attachment 1** for common terms.

1.9. Aircrew Operational Reports. The reporting requirements in this instruction are exempt from licensing in accordance with paragraph 2.11.10 of AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections.*

Chapter 2

COMMAND AND CONTROL

2.1. General. Command and control (C2) of tanker and airlift forces is exercised through a network of command and control centers (C2). C2 centers are executive agents for commanders exercising operational control over mobility forces. The C2 network consists of the AMC TACC, or respective MAJCOM C2 agency for MAJCOM (other than AMC) directed missions, theater Air Operations Centers (AOC), Air Mobility Elements (AME), unit C2s, Air Mobility Control Centers (AMCC), Tanker Airlift Control Elements (TALCE), Special Tactics Teams (STT), and the Pacific Air Force (PACAF) or United States Air Forces Europe (USAFE) Air Mobility Operation Control Centers (AMOCCs).

2.2. Execution Authority. Execution approval will be received through the local command post or command element. The operations group commander will be the executing authority for local training missions. Missions operating outside communications channels will be executed by the aircraft commander (AC).

2.2.1. Supplemental Training Mission (STM). Opportune airlift of cargo and mission personnel may be accomplished as a by-product of crew training missions. STMs may be authorized when minor adjustments can be made to a scheduled training mission or when a productive aircrew training mission can be generated for the airlift. The training mission will not be degraded in any manner to accomplish the STM. Use of STMs for logistical support will be authorized only when normal military or commercial transportation modes are unable to provide required support. STM may be approved by the operations group commander with wing commander coordination. On an STM, ACs will release maximum number of space available seats commensurate with mission requirements and safety.

2.2.2. Off-Station Training Flights. Wing commanders are the approval authority for off-station trainers. Prior to approval, commanders will carefully review each proposed trainer's itinerary to ensure it justifies and represents the best avenue for meeting training requirements. Commanders approving off-station trainers will forward a copy of the planned itinerary to the appropriate NAF/DO, MAJCOM/DOT or ANG/DOO, and TACC/XOB. Approval authority for AFRC UE off-station trainers is HQ AFRC/DOOM.

2.3. Aircraft Commander (AC) Responsibility and Authority. An AC is designated for all flights on the flight authorization, in accordance with AFI 11-401, *Flight Management*, and applicable command supplement. ACs are:

2.3.1. In command of all persons aboard the aircraft.

2.3.2. Responsible for the welfare of the crew and the safe accomplishment of the mission.

2.3.3. Vested with the authority necessary to manage crew resources and accomplish the mission.

2.3.4. The final mission authority and will make decisions not specifically assigned to higher authority.

2.3.5. The final authority for requesting or accepting any waivers affecting the crew or mission.

2.3.6. Charged with keeping the applicable C2 or executing agencies informed concerning mission progress.

2.4. Mission Clearance Decision. The final decision to delay a mission may be made by either the executing agency or the AC when conditions are not correct to start or continue a mission. Final responsibility for the safe conduct of the mission rests with the AC. If the AC refuses a mission, the mission will not depart until the conditions have been corrected or improved so that the mission can operate safely. Another AC and aircrew will not be asked to take the same mission under the same conditions.

2.4.1. Re-routing or diverting a mission. Must be authorized by the execution authority, except in an emergency or when required by enroute or terminal weather conditions.

2.4.1.1. The controlling agency directing the rerouting or diversion is responsible for ensuring the aircraft is compatible with departure, enroute, and destination requirement and facilities.

2.4.1.2. The AC will notify the appropriate command center of any aircraft or aircrew limitation that may preclude diverting or rerouting the mission.

2.4.2. When directing an aircraft to an alternate airfield, the C2 center agency will ensure the AC is provided existing and forecast weather for the alternate, notices to airmen (NOTAMs), and appropriate airfield information from the Airfield Suitability and Restrictions Report (ASRR). If the planned alternate becomes unsuitable while en route, the AC will coordinate with the C2 center for other suitable alternates. The C2 center agency will coordinate with customs and ground service agencies to prepare for arrival. The AC is final authority on selecting a suitable alternate.

2.5. Aircrew Responsibilities. The AC is the focal point for interaction between aircrew and mission support personnel. The local C2 agency is the focal point for all mission support activities. ACs must inform C2 of any factor that may affect mission accomplishment. When transiting a stop without a C2 agency, it is the responsibility of the AC to ensure necessary mission information is placed into the C2 system by the most expeditious means available. The AC will establish a point-of-contact with the appropriate C2 agency prior to entering crew rest.

2.6. Operational C2 Reporting. AMC C2 facilities will normally transmit arrival, departure, and advisory messages to the TACC as appropriate. Aircrews on AMC TACC-controlled missions are responsible for transmitting these messages via L-Band SATCOM, HF, DSN, etc., when transiting stations without an AMC C2 (fixed or mobile) presence. Crews on missions not controlled by the AMC TACC will report to their appropriate controlling agency.

2.6.1. High Frequency (HF) Communications. HF is the primary means of worldwide C2 communications.

2.6.2. L-Band SATCOM. The L-Band SATCOM supplements HF communications by providing a worldwide communications capability suitable for *unclassified* C2 transmissions. Currently, messages can only be sent between aircraft and ground stations.

2.6.2.1. Employment. The L-Band SATCOM equipment aboard aircraft will be used as necessary except on local training missions and missions operating under emission control (EMCON) restrictions prohibiting its use. Limit SATCOM communications to operational traffic. The transceiver will be turned on during preflight and remain configured to receive messages at all times until aircraft power down at destination. The laptop computer will be turned off for takeoff, landing, and while operating below 10,000 feet. For missions operating through sensitive or classified locations disable GPS position reporting in the normal message software and, when available, the automatic position reporting function.

2.6.2.2. Responsibility for equipment and supplies. Aircraft laptop computers are high theft items and will not be left unsecured on the aircraft.

2.6.2.3. Home station. Operations groups will be responsible for storing, maintaining day-to-day control, and administrative accountability of computers. Laptops will be issued via hand receipt to aircrews prior to departure from home base.

2.6.2.4. Enroute. When storing computers at enroute locations, care must be taken to maintain original aircraft tail number and laptop computer match. Laptops may be secured aboard aircraft which have been modified with a suitable secure container (e.g. new gun box capable of holding weapons and computers), provided they will not be exposed to extreme temperatures (below -40 or above 149 degrees Fahrenheit). On aircraft lacking a suitable secure container, or when temperature extremes cannot be avoided, computers will be stored in the command post or other suitable AMC C2 facility. At locations without an AMC C2 presence, crews should use their best judgment and store computers in the most secure facility or location available.

2.6.2.5. Staging Operations. Aircrews and MAJCOM C2 organizations will establish procedures to store and control the laptop computers. Control procedures should maintain original aircraft tail number and laptop computer match. Hand-to-hand crew transfer of the computer is the preferred method. If crew transfer is not possible, inbound crews will store the computer on the aircraft, if secure, and turn in the key to MAJCOM C2 before entering crew rest. If the aircraft lacks a secure container, or if the temperature extremes (paragraph **2.6.2.4.**) cannot be avoided, the computer will be stored by MAJCOM C2. MAJCOM C2 will issue the key or computer, as applicable, to outbound crews ensuring the aircraft/computer match is maintained.

2.6.2.6. L-Band SATCOM Messages and Advisories. The aircrew can send messages by either choosing a pre-formatted template from a menu or composing a free-text message. The following L-Band SATCOM transmissions are required as indicated:

2.6.2.6.1. On-station Message. At the beginning of each crew duty day, transmit an on station message during the initial preflight to verify system operation and update TACC with estimated aircraft takeoff times and other mission data. Further on-station messages during the same crew duty day are not required.

2.6.2.6.2. Inbound 3-hour out messages. At locations with a mobile TALCE presence, the inbound aircrew will send a 3-hour out report to the TALCE.

2.6.2.6.3. Advisories. Transmit (free-text messages) mission delay, in-flight refuel, off/on-load reports as required or directed.

NOTE: The L-Band software acknowledged (A) status code indicates the message was received by the Land Earth Station (LES) and forwarded to TACC. The acknowledged code does not indicate the addressee received the message. If a confirmation is required, specifically request a reply message in the remarks field.

2.6.3. Stations Without C2 Agencies. Report movement information (actual time of departure [ATD], estimated time of departure [ETD], actual time of arrival [ATA], departure load data, delay information, etc.) directly to the controlling C2 center (as appropriate) as soon as possible, by any means available. After takeoff, relay pertinent data to the appropriate C2 agency by any means available. L-Band SATCOM, when available, will be the preferred method for passing routine mission movement reports followed by HF, DSN, etc. The following L-Band SATCOM messages will be transmitted to fulfill mission reporting requirements:

2.6.3.1. Block out.

2.6.3.2. Departure message (Aircraft call sign, ATD, mission status).

2.6.3.3. Arrival/Shutdown. This is currently a free text message. The arrival portion should contain ATA and any other information the aircrew deems necessary to pass to the TACC. If the L-Band SATCOM system is to be shutdown (crew rest, refueling, mission complete, etc.), inform the TACC that the aircraft can no longer receive messages.

NOTE: For critical C2 communications, i.e. aircraft waiver request, voice communications (HF, DSN, etc.) are still the primary method with L-Band SATCOM as a back up.

2.6.4. Report movement information (departure, arrival, or diversion) and airlift mission recapitulation (recap) reports (number of passengers, pallets, tons of cargo, and special category information) to the appropriate C2 agencies via SATCOM or global high frequency (HF) stations. Provide relay instructions for global HF stations to pass reports to appropriate agencies.

NOTE: All HF transmissions will be restricted to operational traffic, i.e. movement reporting, itinerary revisions, maintenance status, flight plan information, etc.

2.6.5. Enroute Reporting. Full time connectivity between C-130s and the appropriate controlling agency is desired. Adhere to the following procedures:

2.6.5.1. CONUS. C2 agencies may advise aircrews via the controlling ATC agency to establish contact when communication are necessary. Refer to the flight information publication (FLIP) concerning global HF station procedures in contacting MAINSAIL. Periodic "ops normal" calls or continuous monitoring of L-Band SATCOM or global HF station frequencies are not normally required. TACC may specify increased reporting procedures.

2.6.5.2. OCONUS. The controlling agency will specify increased reporting procedures (if needed) through a communications plan in the operations plan (OPLAN), operations order (OPORD), or Mission Directive. Aircrews will transmit L-Band messages or relay calls to global HF stations for relay to the controlling C2 agency as specified in the communications plan. Maintain listening watch on L-Band or US Global HF system as specified in the communications plan.

2.6.6. Arrival Advisory. Aircrews on operational missions transmit HF arrival advisory to the destination C2 agency or, in the absence of a local C2 agency, to TACC when approximately 2-3 hours from destination. Furnish the following information:

2.6.6.1. Aircraft call sign.

2.6.6.2. Mission number.

2.6.6.3. ETB (estimated time in block).

2.6.6.4. Maintenance status (See the definitions for a list of maintenance status codes in **Attachment 1**).

2.6.6.5. Distinguished visitor (DV) status and honors codes (Transmit the DV code of each DV on board.) Do not pass the name of the DV on board without the consent of the DV. Outside the CONUS, DO NOT pass the name of the DV over unsecure radios.

2.6.7. Aircrews transmit a UHF or VHF arrival advisory as soon as contact can be established with the destination C2 agency. The following information should be furnished:

2.6.7.1. Aircraft call sign.

2.6.7.2. Mission number.

2.6.7.3. ETB.

2.6.7.4. Maintenance status.

2.6.7.5. DV code and requirements.

2.6.7.6. Number of passengers.

2.6.7.7. Hazardous cargo and remote parking requirements.

2.6.7.8. Additional service required.

2.6.7.9. Number of pallets to be downloaded and number that are through manifested.

2.6.7.10. Passenger and pallet space and weight available for the next mission segment.

2.6.7.11. Fuel Requirements.

2.6.8. DV Messages. Airborne unclassified messages originated by DV passengers may be transmitted at the discretion of the AC.

2.7. Mission Commander.

2.7.1. A mission commander will be required when more than two aircraft are assembled to perform missions away from home station. The tasked unit will designate a mission commander for overall mission responsibility, crew duties and crew rest permitting. When conflicts with crew responsibilities exist, a separate mission commander should be appointed to ensure mission coordination is accomplished.

2.7.1.1. For AMC-tasked missions, TACC/XOO will coordinate and designate a lead planning agency when more than one airlift unit is involved in an airdrop or tactical airland operation. For theater airlift missions with more than one airlift unit involved, a central planning agency will be designated to be responsible for coordinating the entire mission with all involved airlift, user, and planning agencies. The lead planning agency will designate a mission commander. The mission commander will be a rated (normally field grade) officer qualified in the type of mission being employed. For formation airdrop/tactical airland missions of greater than three aircraft, the mission commander will normally be a tactically rated field grade officer.

2.7.1.2. For all multi-ship operations, tasked units will ensure an appropriate level of ground and flight supervision are provided for the entire mission. Emphasis should be placed on who is the overall airborne commander, and who are the subordinate commanders, for each type aircraft in the operation.

2.7.2. For airdrop/airland missions, the agencies responsible for mission tasking will coordinate a mission commander for all phases of the mission and ensure all participating aircrews are briefed and advised of mission commander assignment.

2.7.3. The mission commander is the final authority responsible for ensuring aircrews have properly coordinated mission details.

2.7.3.1. Prior to entering crew rest for the mission, the mission commander will coordinate with the lead planning agency. During this coordination, the mission commander will review mission itinerary and receive points of contact for aircraft which are non-collocated.

2.7.3.2. The mission commander will ensure required mission and formation briefings are completed by all collocated aircrews. The AC may excuse loadmaster and flight engineers for pre-flight/loading duties.

2.7.3.3. When non-collocated aircraft are involved, the mission commander (in conjunction with the lead planning agency) will ensure all applicable information, to include rendezvous, formation, abort, and recovery procedures, is relayed to non-collocated aircrews. The mission commander will ensure that controlling agency and all non-collocated aircraft are informed of anticipated delays or mission changes.

2.8. C2 Agency Telephone Numbers. Units should publish a listing of telephone numbers to assist crews in coordinating mission requirements through appropriate C2 agencies. It should be made readily available to crews, by publishing it in the flight crew bulletin (FCB), read file, or other appropriate publication.

2.9. Close Watch Missions. Close Watch missions are designated missions *(e.g. CSAR; medevac, PHOENIX BANNERs)* which receive C2 special attention. Close Watch procedures are initiated so that all possible actions are taken to ensure on-time accomplishment and notification to the user when delays occur or are anticipated. Promptly notify the appropriate C2 channels of delays, aborts, or other events that affect on-time departure and advise them of the estimated time in commission (ETIC), new ETD, and ETA. Notify the C2 agency within 10 minutes of event and confirm that the user and OPR have been advised.

2.10. Posse Comitatus. It is the policy of the Department of Defense to cooperate with civilian law enforcement officials to the maximum extent practicable. AFI 10-101 incorporates the appropriate directive and provides uniform policies and procedures to be followed concerning support provided to federal, state, and local civilian law enforcement agencies. It establishes specific limitations and restrictions on the use of Air Force personnel, equipment, facilities, and services by civilian law enforcement organizations. Report all requests for assistance and coordinate all requests from civilian law enforcement authorities through the appropriate C2 channels.

Chapter 3

CREW COMPLEMENT/MANAGEMENT

3.1. Aircrew Qualification. Primary crewmembers, or those occupying a primary position during flight, must be qualified, or in training for qualification, in that crew position. If non-current, or in training for a particular event, the crew member must be under the supervision of an instructor while accomplishing that event (direct supervision for critical phases of flight).

EXCEPTION: Senior staff members who have completed a Senior Staff Familiarization course may occupy either pilot seat under direct IP supervision. These individuals will log “OP” for Flight Authorization Duty Code on the AFTO Form 781, **AFORMS Aircrew/Mission Flight Data Document**.

3.1.1. Pilots.

3.1.1.1. Missions with passengers. With passengers on board, takeoff, climb out, flight under actual instrument conditions, approach, and landing may be made by either the pilot or the copilot. Only a pilot that is qualified (current and valid AF Form 8, **Certificate of Aircrew Qualification**, for the occupied position) will occupy a pilot’s seat with passengers on board the aircraft.

Exception: A pilot regaining currency under direct IP supervision (in the seat at the controls) may also fly with passengers on board.

3.1.1.2. Touch and go landings with passengers are prohibited (N/A MAJCOM approved maintenance personnel).

3.1.1.3. Left seat training. With squadron commander approval, current and qualified copilots may be allowed to fly in the left seat provided they are under direct IP supervision and no passengers are carried.

3.1.2. Navigators, Flight Engineers, and Loadmasters. Non-current or unqualified navigators, flight engineers, or loadmasters may perform in their primary crew position on any mission when supervised by a qualified instructor or flight examiner of like specialty (direct supervision for critical phases of flight).

3.1.3. Sq/CCs or deployed mission commanders may authorize flights without a navigator when not required for mission accomplishment.

NOTE: A navigator should be required to fly on a training mission if reported or forecasted thunderstorms or other inclement weather exists. Units will establish procedures regarding the use of navigators on proficiency trainers.

3.1.4. An adverse weather aerial delivery system (AWADS), or IMC airdrop capable qualified AC and navigator will be in the seat during actual IMC personnel airdrops.

3.1.5. Grid navigation requirements. Missions North of 65°N latitude or South of 70°S latitude, or in any airspace where FLIP enroute charts denote compass indications may be erratic or depict airways, tracks, or navigational aids oriented to true or grid north (e. g., Canadian Northern Airspace) require a grid-qualified navigator. ***EXCEPTIONS***:

3.1.5.1. Flights within Alaska.

3.1.5.2. Flights on published airways using magnetic references. Destination and alternates must have published magnetic instrument approaches.

3.1.5.3. Aircraft equipped with two or more operable independent navigational systems.

3.1.5.4. Navigators on rescue alert at Kulis ANGB or Keflavik NAS will be grid qualified.

3.2. Crew Complement. Minimum crew complement for basic and augmented flight duty period (FDP) are in **Table 3.1.**. ***EXCEPTION:*** Crew complement for specialized mission (e.g. AE, Aerial Spray, and MAFFS) is addressed in chapters covering those missions.

Table 3.1. Crew Complement.

Crew Position	Basic	Augmented	Tactical
Aircraft Commander	1	2 (1)	1
Copilot	1	1	1
Navigator	1 (5)	2 (1)	1/2 (2)
Flight Engineer	1	2	1
Loadmaster	1 (2) (4)	2	1/2 (3)

NOTES:

1. The ACs and navigators must be qualified in the appropriate mission to be accomplished. Transfer of pilot-in-command (PIC) duties between qualified ACs will be briefed to the crew.
2. Two navigators/loadmasters may be required, at the unit commander's discretion, depending on mission complexity.
3. Only one loadmaster is required for tactical missions if: Using only one paratroop door for personnel or door bundle (less than 100 lbs) drops; High altitude (up to 13,000 feet MSL) non-static line personnel are dropped from the ramp and door or, only one paratroop door is opened. Dropping only simulated airdrop training bundles (SATBs); A no-drop (dry pass) is planned and ground time is sufficient to permit onload or offload by one loadmaster.
4. Two loadmasters or one loadmaster and another qualified crewmember are required if more than 40 passengers are scheduled to be carried (except during unit moves or contingencies). Both crewmembers must remain in the cargo compartment, one forward and one aft for takeoffs and landings.
5. See paragraph **3.1.3.**.

3.2.1. Minimum crewmembers for local flights are the pilot, copilot, flight engineer and loadmaster. When more than one crewmember is required at a position, SQ/CC will determine whether an instructor and student will meet mission requirements.

3.2.2. Augmented crews are required when a mission cannot be safely completed within a basic FDP. Augmentees must be current and qualified in the aircraft and mission ready in accordance with AFI 11-2C-130V1, C-130 Aircrew Training. In those situations requiring augmentation, the crew must be augmented from the start of the duty period. MAJCOM DO/XO approval is required for additional crewmembers to join the mission enroute for augmentation. If augmentees are added to the crew, the crew's FDP will be computed based on the FDP of the most limited person.

3.2.2.1. An additional flight engineer or scanner may be used for basic or augmented crews in those units without loadmaster UMD authorizations, provided no more than 30 passengers are carried or exceeds 500-lbs (100-lbs maximum per single item) or requires special handling in accordance with AFJMAN 24-204. ANG/AFRC units may use an additional flight engineer provided these provisions are met.

3.2.3. Tactical Airlift Formation Lead Requirements.

3.2.3.1. Unilateral training VMC - no special requirements.

3.2.3.2. Unilateral training IMC.

3.2.3.2.1. Single-element formations. A lead crew or one instructor AC is required in the formation (any position). If this crew aborts and no other instructor AC or lead crew remains, the other aircraft must abort the mission or continue single-ship, as determined by the mission commander.

3.2.3.2.2. Multiple-element formation. A lead crew or instructor AC is required in the lead and deputy lead position. Element lead positions require an instructor AC, lead crew, or an AWADS crew. If deputy lead or an element lead abort after station time, any crew can assume their position with the concurrence of the mission commander. Any crew can fly the last ship of a formation even if it is an element lead position.

NOTE: For AWADS, deputy lead may fly as second element lead provided no aircraft occupy the number two and three positions in the first element.

3.2.3.3. Other than unilateral (IMC and VMC). A lead crew is required in the lead and deputy lead positions. Element lead positions require a lead or an AWADS crew. If deputy lead or an element lead aborts after station time, a new lead or AWADS crew will assume their position. Any crew can fly the last ship of a formation even if is a deputy or element lead position.

3.3. Scheduling Restrictions. Crewmembers will not be scheduled to fly, nor will they perform crew duties:

3.3.1. When the maximum flying time limitations of AFI 11-202V3, *General Flight Rules* will be exceeded.

3.3.2. After consuming alcoholic beverages within 12-hours of takeoff or when under the influence of alcohol.

3.3.3. Do not takeoff early (before scheduled departure time) if the early takeoff time would violate these restrictions.

3.3.4. After consuming alcoholic beverages within the 12-hour period prior to assuming standby force duty (except CHARLIE standby force duty).

3.3.5. Within 72-hours of donating blood. The flying unit commander must approve the donation of blood by crewmembers in a mobility assignment or who are subject to flying duties within this 72-hour period. Crewmembers should not normally donate blood.

3.3.6. When taking oral or injected medication unless individual medical waiver has been granted by the Command Surgeon. Crewmembers may not self-medicate except as noted in AFI 48-123, *Medi-*

cal Examinations and Standards. The following is a partial list of medications, which may be used without medical consultation:

3.3.6.1. Skin antiseptics, topical anti-fungal, 1 percent Hydrocortisone cream, or benzoyl peroxide for minor wounds and skin diseases, which do not interfere with the performance of flying duties or wear of personal equipment.

3.3.6.2. Single doses of over-the-counter aspirin, acetaminophen or ibuprofen to provide analgesia for minor self-limiting conditions.

3.3.6.3. Antacids for mild isolated episodes of indigestion.

3.3.6.4. Hemorrhoidal suppositories.

3.3.6.5. Bismuth subsalicylate for mild cases of diarrhea.

3.3.6.6. Oxymetazoline or phenylephrine nasal sprays may be used by aircrew as "get-me-downs" should unexpected ear or sinus block occur during flight. These should not be used to treat symptoms of head congestion existing prior to flight.

3.3.7. Within 24-hours of compressed gas diving (including scuba); surface supplied diving, or hyperbaric (compression) chamber exposure and aircraft pressurization checks that exceed 10-minute duration.

3.3.8. Within 12-hours after completion of a hypobaric (altitude) chamber flight above 25,000 feet. Personnel may fly as passengers in aircraft during this period, provided the planned mission will maintain a cabin altitude of 10,000 feet MSL or less. For altitude chamber flights to a maximum altitude of 25,000 feet or below, aircrew members may fly without delay as crewmembers or passengers if their cabin altitude does not exceed 15,000 feet.

3.3.9. Aircrew members who accomplish aircraft ground pressurization checks of less than 10 minutes duration will be restricted from flying for 30-minutes.

3.4. Alerting Procedures.

3.4.1. Crew alerts normally will be 3+l5 before scheduled takeoff time to allow one hour for reporting and 2+l5 for mission preparation. Self-alert procedures may also be used for normal local training missions.

3.4.1.1. Self-alerting may be requested by the AC, but is not normally recommended on operational missions to avoid potential crew duty limitations resulting from mission changes. Early alerting, to provide additional reporting for mission preparation time is authorized when absolutely essential for mission accomplishment. Late alerting is also authorized; however, all requests for changes to standard alerting times must be coordinated through the appropriate C2 agency.

3.4.1.2. If no controlling C2 agency is available crews will self-alert.

3.4.1.3. With AC concurrence, loadmasters may be alerted early when loading requirements (i.e., outsized cargo and dash 9 section VI cargo) dictate a need for early alerting but no more than two hours prior to the crew alert. If early alerting will be required, the loadmaster must be notified of that intent prior to entering crew rest. In no case should the loadmaster be alerted more than 1-hour before the commencement of actual cargo loading operations. Crews and C2 must consider that when the loadmaster reports early, the available flight duty period for the crew will be limited by the loadmaster's show time.

3.4.2. A crew will not be alerted until the aircraft is in commission or there is reasonable assurance the ETIC will meet the proposed takeoff time.

3.4.2.1. Crew Alerting on Inbound Aircraft. On missions where a crew change is planned and the authorized ground time is 4+15 or less, an aircrew may be alerted on an inbound maintenance status of A-l, A-2, or A-3. Outbound crews are not alerted on A-2 or A-3 status until required parts are known to be available and maintenance determines the aircraft can be in-commission within the planned ground time.

3.4.3. The AC may request crew enhancement crew rest (CECR) when he or she desires a later legal for alert time to normalize the crew work-rest cycle or enhance messing options immediately prior to crew alert. To minimize adverse effects on established schedules, aircraft flow, and capability, CECR requests should be of minimum duration and normally be limited to de-positioning legs. Send requests through C2 Center channels for approval decision. When requests are disapproved, the controlling C2 Center will notify the AC through C2 channels of the reason for disapproval.

3.4.4. Aircrew release policy is as follows**:** (Applicable to ARC only when performing TACC missions).

3.4.4.1. On the aircrew's initial entry or re-entry into crew rest, the controlling C2 agency or AC during (self-alerts when applicable), will establish an expected alert time. The crew will not be alerted, or otherwise disturbed, before this time except for emergencies.

3.4.4.2. The latest allowable alert time will be 6-hours after the expected alert time for all missions. If circumstances warrant, the AC may extend the window to a maximum of 8-hours. When advised the crew will be deadheading, the AC may extend the window to 12 hours. ANG/AFRC crewmembers may extend the window as necessary to allow deadhead return to home station within Scheduled Return Time (SRT). The controlling C2 agency will not request the aircrew accept more than a 6-hour window.

3.4.4.3. If the controlling C2 agency determines a crew will not be alerted in the allowable time span, then at the time of determination (but no earlier than the crew's expected alert time) the controlling C2 agency will reenter the crew into crew rest of not less than 12 hours and establish a new expected alert time.

3.4.4.4. When the latest allowable alert time expires without being alerted, then:

3.4.4.4.1. The crew reenters crew rest of not less than 12-hours.

3.4.4.4.2. The AC will contact the controlling C2 agency to determine the new expected alert time and establish a new latest-allowable alert time.

3.5. Stage Management. (Does not apply to ANG or AFRC).

3.5.1. Stage Posture. Stages operate on a directional basis. Alert sequence is as follows:

3.5.1.1. Crews requiring an emergency return to home station.

3.5.1.2. By the crew's scheduled return time (SRT). Returning stage crews will be prioritized by their SRTs.

3.5.1.3. Crews in stage over 48-hours.

3.5.1.4. Crews in sequence of arrival time.

NOTE: If a stage crew is forced to return to crew rest because of a mission delay or abort, that crew becomes first out when legal for alert.

3.5.2. Mechanical Stage. Mechanical stages may be established by the C2 agency where no crews are staged. The stage is created when a mission is delayed or aborted and the crew goes into crew rest. Mechanically staged crews become first out in the same direction when legal for alert. An inbound crew may be bumped from the mission even though they have sufficient duty time remaining to complete that mission. ***EXCEPTION***: ARC crews flying unit-equipped aircraft should not normally be mechanically staged.

3.6. Crew Duty Time (CDT) and Flight Duty Period. CDT is the amount of time an aircrew may perform combined flight and ground duties. FDP is the time period between mission reporting and final aircraft engine shutdown. For planning purposes, CDT normally consists of FDP plus 45-minutes, not to exceed the maximum CDT. When post flight duties exceed 45-minutes, CDT is FDP, plus the time required to complete the post-flight related duties.

3.6.1. CDT and FDP both begin one hour after alert. ***EXCEPTIONS:***

3.6.1.1. Self-alerts: CDT and FDP will begin at scheduled or established mission reporting time.

3.6.1.2. ALFA standby: CDT and FDP will begin when the crew is told to launch.

3.6.1.3. BRAVO standby: CDT and FDP begin when the crew shows for duty.

3.6.1.4. Crewmembers performing other duties prior to flight related duties: CDT and FDP begin when reporting for other duties.

3.6.2. The length of FDP will be established by the mission directive or C2 agency when the crew shows for duty and is briefed for the mission. FDP will not be extended to an augmented day after a basic FDP has begun regardless of crew composition. FDP will not be based on crew composition, but rather on mission requirements.

3.6.3. FDP ends at engine shutdown following completion of final mission segment.

3.6.4. Normally, CDT ends 45-minutes after engine shutdown at the end of the mission. If any crew member must perform mission-related duties beyond 45-minutes, CDT does not end until that crew member completes these duties. These duties include up or downloading, servicing, debriefing, mission planning, etc. Except when authorized by unit commanders at home station or deployed locations, crewmembers will not be used for mission related duties supporting other missions; i.e. to preflight other aircraft. Post-mission duties will not exceed maximum CDT.

3.6.4.1. At home station or deployed locations, unit commanders may authorize crewmembers be used for post mission duties supporting other missions; i.e., loading supervisors for other aircraft. These duties will not exceed 12-hours of CDT.

NOTE: FDP includes both military duty and civilian work and begins when the reporting for the first duty period (military or civilian).

3.6.5. Basic Crew FDP:

3.6.5.1. Maximum FDP for basic crew is 16-hours. The basic FDP is 12-hours without a fully operative autopilot.

3.6.5.2. Maximum CDT for a basic crew is 18-hours.

3.6.6. Augmented Crew FDP:

3.6.6.1. Maximum FDP for an augmented crew (operational mission only) is 18-hours. FDP is 16 hours without a fully operative autopilot. Only the pilot portion of the crew needs augmentation when the autopilot is inoperative.

3.6.6.1.1. Maximum FDP for nuclear airlift missions is 6-hours. Twelve hours without a fully operative autopilot (regardless of crew augmentation).

3.6.6.2. Basic crews will not be augmented after FDP has started. (see paragraph **3.2.2.**)

3.6.6.3. Maximum CDT for augmented crews is 20-hours.

3.6.7. Training, Tactical, and functional check flight/acceptance check flight (FCF/ACF) FDP:

3.6.7.1. Maximum FDP for training, tactical, and FCF/ACF missions is 16 hours. FDP is 12 hours without a fully operative autopilot.

3.6.7.2. Events (i.e., FCF/ACF, transition, or tactical) must be completed during the first 12 hours of the FDP.

NOTE: This requirement does not prevent missions from continuing to home station or deployed staging base once training events are accomplished (not to exceed 16-hours with a fully operative autopilot).

NOTE: AFRC and ANG crews may perform training, tactical, or FCF/ACF missions provided time from start duty does not exceed 16-hours.

3.6.8. If autopilot fails after departure, consider mission requirements and determine best course of action to preclude further mission delays due to reduced FDP. Best course of action may include divert to an airfield with maintenance capability. Contact C2 agencies, coordinate intentions, and comply with the preceding limitations.

3.6.9. Deadhead Time. Duty time for crewmembers positioning or de-positioning for a mission or mission support function.

3.6.9.1. Crewmembers may perform primary crew duties after deadheading if they will not exceed a basic FDP for the mission to be flown beginning at reporting time for the deadhead flight.

3.6.9.2. Crewmembers may deadhead following primary crew duties if they will not exceed a 24-hour CDT beginning at reporting time for primary crew duties.

3.6.10. CDT/FDP Extensions. See AFI 11-202V3, *General Flight Rules*, and the following: MAJCOM/DO are waiver authority. For crews flying AMC-directed missions, AMC/DO is the MAJCOM/DO waiver authority as specified above (contact the TACC to request the waiver). Exception: The 89 AW/CC is delegated waiver authority for CVAM-directed special assignment airlift missions (SAAM).

3.6.11. Flight examiners administering evaluations will not exceed an augmented FDP.

3.7. Crew Rest. MAJCOM/DO may waive all or any part of a crew rest period in accordance with AFI 11-202V3. Crewmembers will enter crew rest a minimum of 12-hours before alert time or, when self alerting, 12-hours before reporting time.

3.7.1. Home-Station Pre-departure Crew Rest. All primary and deadhead crewmembers should enter crew rest 24-hours prior to alert time for missions scheduled away from home station for more than 16-hours. Crewmembers may perform limited non-flying duties, including mission planning, during the first 12-hours of this period (***EXCEPTION***: ARC in accordance with AFI 11-202V3). OG/CC is the waiver authority for the first 12-hours of pre-departure crew rest. Deadhead crewmembers will not be manifested as passengers to reduce or eliminate crew rest requirements.

3.7.2. Enroute Crew Rest and Ground Time:

3.7.2.1. Crew rest normally begins 45-minutes after final engine shutdown. The 45-minute time period provides crews with time to complete normal post-flight duties. These duties include, but are not limited to, refueling, up and downloading of cargo, performing maintenance, or completing mission debriefings.

3.7.2.2. If any crew member must stay at the aircraft past the 45-minute period, crew rest does not begin until post-flight duties are completed.

3.7.2.3. Minimum crew rest period is 12-hours. This period provides the crew a minimum of 8-hours of uninterrupted rest plus time for transportation, free time, and meals. The crew will not be disturbed during this period, except during emergencies. Should the 12-hour crew rest period be infringed upon by official duties, the crew will enter crew rest for an additional 12-hours on completion of the official duties.

3.7.2.4. A minimum 16-hour (17-hours for nuclear airlift missions) ground time between engine shutdown and mission takeoff should normally be planned unless extended post-flight duties are anticipated.

3.7.2.5. The AC may modify normal ground time with the controlling agency:

3.7.2.5.1. In the interest of safety.

3.7.2.5.2. To no less than 12-hours from the start of crew rest until mission reporting. Before reducing normal ground time consider mission preparation time, time to load cargo, and other factors peculiar to the mission. The controlling C2 agency will not ask the AC to accept less than a normal ground time. Waivers for exercises and contingencies are according to AFI 11-202V3.

3.7.2.5.3. To a maximum of 36-hours, when the crew has completed three consecutive near maximum FDPs.

NOTE: Flight crews should be afforded crew rest times in excess of the minimum at enroute stations, when possible, to give crews the opportunity to overcome the cumulative affects of fatigue while flying on several consecutive days or transiting several time zones.

3.7.3. Post-Mission Crew Rest (PMCR). Not applicable to ANG and AFRC forces.

3.7.3.1. Crewmembers, returning to their home base, will be given sufficient time to recover from the cumulative effects of their deployed mission and tend to personal needs. PMCR begins immediately on mission termination.

3.7.3.2. Provide one hour of PMCR time (up to a maximum of 96-hours) for each 3-hours TDY when the duty exceeds 16-hours away from home-station. This time is in addition to, and will not run concurrently with, pre-departure crew rest. PMCR is not applicable to continuing missions.

3.7.3.3. The OG/CC or acting representative is designated PMCR waiver authority and will not delegate this authority. Limit PMCR waivers to extraordinary circumstances only and must not be used for day-to-day operations.

3.7.4. Crews will reenter crew rest if their aircraft or mission is not capable of departure within 4 hours from scheduled takeoff time. Exceptions will be granted only with the concurrence of the AC.

3.7.5. Flying Crew Chief Work and Rest Plan. The crew chief is responsible to the AC. The AC, in conjunction with the enroute station chief of maintenance, will determine how long the crew chief can safely perform aircraft recovery actions. The crew chief must have the opportunity to sleep 8-hours in each 24-hour period. See AFI 21-101, *Maintenance Operations and Management Policy*, for detailed guidance.

3.7.6. Crew rest waivers approved for exercises and contingencies will be published in the OPORD, OPLAN or CONOPs.

3.8. Standby Force Duty.

3.8.1. Types of Standby Forces.

3.8.1.1. ALPHA Standby Force. An aircraft and aircrew capable of launching in 1 hour. Crewmembers are given 12-hours of pre-standby crew rest before or after aircraft preflight. Aircrews must complete all preflight duties within 6-hours of crew show time. An additional 12-hour pre-standby crew rest is required when preflight time exceeds 6 hours and crew rest was given before the preflight. Once an ALPHA force is formed, additional pre-flights may be necessary to maintain the ALPHA aircraft. Additional pre-flights done during normal waking hours do not interrupt crew rest. A crew will not stay on ALPHA standby duty for more than 48-hours. After 48-hours, the crew must be launched, released, or entered into pre-departure crew rest. CDT begins when the crew is told to launch.

3.8.1.2. BRAVO Standby Force. An aircraft or aircrew capable of launching in 3-hours (from the time the crew is told to launch). Crewmembers are given 12-hours of pre-standby crew rest. Crews are legal for alert after pre-standby crew rest. Preflight duties, if required, interrupt crew rest. A crew will not stay on BRAVO standby duty for more than 48-hours. After 48-hours, the crew must be launched, released, or entered into pre-departure crew rest. CDT begins when the crew shows for duty. If a crew is pre-flighting when the unit is tasked to launch the mission, CDT will begin when the crew first reported for that duty.

3.8.1.3. CHARLIE Standby Force. An identified aircrew capable of entering crew rest within 2-hours (after their controlling unit is notified). This aircrew would become legal for alert 12-hours after entering crew rest. Charlie alert will not exceed 72-hours. If retained for a 72-hour period, crewmembers will be released for 12-hours before resuming CHARLIE Standby Force duty, entering crew rest for mission, or entering pre-standby crew rest for ALPHA or BRAVO Standby Force duty.

3.8.1.4. Wing Standby Forces. Standby forces are established by unit commanders. Crewmembers are given normal pre-departure crew rest. Standby duty time is limited to 12-hours. Crews will receive at least 12-hours of crew rest prior to another 12-hours of standby duty.

3.8.2. Standby Force Crew Management.

3.8.2.1. Commanders will not use a standby crew to preflight other than their standby aircraft, or to do any non-mission duties while on standby.

3.8.3. Post-Standby Missions. On completion of standby duty, aircrew members may be dispatched on a mission.

3.8.3.1. Standby duty and pre-departure crew rest may be concurrent if notification is provided at least 12-hours before alert.

3.8.3.2. If started, post-standby crew rest must be completed before the start of pre-departure crew rest.

3.8.3.3. If an aircrew member is dispatched on a mission, compute the post-mission crew rest time on standby time plus mission time.

3.8.4. Post-Standby Crew Rest. Aircrew members not dispatched on a mission following standby duty will receive post-mission standby crew rest as follows:

3.8.4.1. If standby duty is performed away from normal quarters, crew rest time is computed from this standby time on the same basis as for mission time.

3.8.4.2. If standby duty was performed in normal quarters, no crew rest time is authorized.

3.8.5. ALPHA Standby Aircraft Security. Each unit will complete a maintenance and aircrew preflight inspection when they put an aircraft on ALPHA standby status. The AC will ensure the aircraft is sealed after preflight. Secure all hatches and doors to show unauthorized entry. Close and lock the crew entrance door with a controllable device, which will prevent entry without damage to the door or lock. The command post must grant permission prior to persons entering an aircraft once the plane is sealed. Ensure standby aircraft is resealed any time the aircraft has been opened. The AC or designated representative must be present if access to the assigned aircraft is required.

3.8.6. Aircraft Configuration:

3.8.6.1. ALPHA Standby.

3.8.6.1.1. Aircraft will be configured C2 - MOD-winch and ramp support installed, 30 sidewall seats installed and folded down, 12 wheel well seats installed and folded up (or as directed by the tasking authority).

3.8.6.2. BRAVO Standby.

3.8.6.2.1. Configuration will be as directed by higher headquarters. When setting up a BRAVO standby force the tasking authority will provide the following:

3.8.6.2.1.1. Aircrew qualification and number of loadmasters.

3.8.6.2.1.2. Aircraft configuration.

3.8.6.2.1.3. Fuel load.

3.8.6.2.1.4. Auxiliary equipment required.

3.8.6.3. PHOENIX BANNER ALPHA and BRAVO Standby will be configured according to AFI 11-289.

3.9. Orientation Flights and Incentive Flights. Refer to DoD 4515.13-R, AFI 11-401, *Flight Management*, and the appropriate MAJCOM supplement.

3.10. Interfly.

3.10.1. Interfly is the exchange and/or substitution of aircrew members and/or aircraft between mobility units to accomplish flying missions. OG/CC, or as specified in the appropriate MAJCOM supplement (ANG use ANG/DO approval-level and AFRC use AFRC/DO approval-level) may authorize the interfly of assigned aircrews and/or aircraft. Normally, interfly should be limited to specific operations, exercises, or special circumstances but, may be used to relieve short-term qualified manpower shortfalls. During contingencies, exercises, or designated “interfly” missions, interfly operations will be conducted under the following conditions or as specified in the OPLAN or CONOPS.

3.10.2. When approved, interfly during normal day-to-day operations under the following conditions:

3.10.2.1. Aircraft ownership will not be transferred.

3.10.2.2. As a minimum, crews will be qualified in the MDS-aircraft and model, as well as systems or configuration required to fly the aircraft and/or mission.

3.10.2.3. During interfly, crew member (s) will follow "basic" operational procedures (see Combined Operations, paragraph **1.5.1.**) and must brief MAJCOM-specific items.

3.10.2.4. Initiate interfly approval request by the unit or agency requesting the agreement by memo or message format to the OG/CC controlling the resource. Each commander involving resources (personnel or aircraft) (or MAJCOM, if appropriate) must concur with interfly proposal. Request must include details of the deployment or mission including; aircrew name(s), duration, or special circumstances.

3.10.2.5. Flight Mishap accountability is MAJCOM designated by PEID code for mishap aircraft.

3.10.2.6. Ground Mishap accountability in accordance with AFI 91-204, *Safety Investigations and Reports*.

Chapter 4

AIRCRAFT OPERATING RESTRICTIONS

4.1. Objective. The ultimate objective of the aircraft maintenance team is to provide an aircraft for launch with all equipment operational (Fully Mission Capable, FMC). Manpower limitations, skills, and spare part availability have a negative and direct impact on accomplishment. However, under specific circumstances, some missions can be safely operated without all equipment being operational. Using the following policies, the AC is the final authority in determining an overall status of an aircraft. Use the following maintenance identifiers to effectively communicate an status of an aircraft:

4.1.1. Mission Essential (ME). An item, system, or subsystem component essential for safe aircraft operation or mission completion will be designated Mission-Essential (ME) by the AC in AFTO Form 781A, **Maintenance Discrepancy and Work Document**. Include a brief explanation of the reason for ME status in the AFTO Form 781A discrepancy block. An AC accepting an aircraft (one mission or mission segment) without an item or system does not commit that AC (or a different AC) to subsequent operations with the same item or system inoperative.

4.1.2. Mission Contributing (MC). Any discrepancies that are not currently ME, but may become ME (if circumstances change), are designated as MC in the AFTO Form 781A discrepancy block. Every effort will be made to clear the MC discrepancies at the earliest opportunity to the extent that maintenance skills, ground time, and spare part availability permit. If subsequently, in the AC's judgment, mission safety would be compromised by the lack of any component, he may re-designate the said component as ME. However, do not delay a mission to correct an MC discrepancy.

4.1.3. Open Item. Discrepancies not expected to adversely impact the current mission or any subsequent mission are not designated MC or ME. These items receive low priority and are normally worked at home station. Do not accept an aircraft from factories, modification centers, or depots unless all instruments are installed and operative.

4.1.4. Engine performance, aircraft attitude, vertical velocity indications, altitude, speed, and heading instruments should be operative in both pilot positions IAW AFI 11-202V3. For instruments with both analog and digital displays, as a minimum the analog must be operational (Exception: the radar altimeter may have either analog or digital operational).

4.2. Policy. It would be impractical to prepare a list that would anticipate all possible combinations of equipment malfunction and contingent circumstances. This chapter lists the minimum equipment and systems considered essential for routine as well as contingency operations. The list does not necessarily include all equipment or systems essential to airworthiness (e.g. rudder, ailerons, elevators, flaps, tires, etc.). Those items which state a minimum requirement and have no listed exceptions are grounding items.

4.2.1. The AC is responsible for exercising the necessary judgment to ensure no aircraft is dispatched with multiple items inoperative that may result in an unsafe degradation and/or an undue increase in crew workload. The possibility of additional failures during continued operation with inoperative systems or components shall also be considered. This chapter is not intended to allow for continued operation of the aircraft for an indefinite period with systems/subsystems inoperative. The Minimum Equipment List (MEL) shall not direct deviation from the aircraft flight manual limitations, emergency procedures, or USAF/MAJCOM directives. The diversity of the C-130 operating on various worldwide missions complicates the task of balancing operational reliability with safe mission completion. Safety-of-flight is paramount.

4.2.2. If, after exploring all options, an AC determines a safe launch is possible with an item inoperable (beyond a particular restriction) the AC shall request a waiver. Use C2 channels to notify the appropriate execution agency of intentions. Plan a minimum 1-hour response to the waiver request.

4.3. Waiver Protocol. Waiver to operate with degraded equipment or waiver to USAF policy exceeding this AFI may be granted on a case-by-case basis and only in exceptional circumstances. Waiver authority is based on "who" has operational control and execution of the aircraft performing a specific mission. The aircraft commander determines the need for a waiver and initiates the request.

4.3.1. Local Missions (executed by unit OG/CC or equivalent). Waiver authority for active duty units flying local missions is the active duty OG/CC or equivalent. For Unit Equipped (UE) ARC units, waiver authority is the OG/CC or equivalent.

4.3.2. AMC-Directed Missions. Waiver authority for active duty and AFRC or ANG units flying AMC or AMC-directed missions controlled by the AMC/TACC (includes HQ AMC Operational Readiness Inspections) is HQ AMC/DO. HQ AMC/DOV personnel are the authorized agent and maintain 24-hour watch through the appropriate TACC cell (East or West).

4.3.3. Other Missions (Contingencies). Waiver authority is listed in the OPORD/Tasking Order, etc., or is the DIRMOBFOR (or equivalent) for the agency with C2 of the aircraft. Crewmembers may request additional assistance or confirmation from their home units or MAJCOM/DO through the TACC, or as specified in MAJCOM Supplement.

4.3.4. ARC-Directed Missions (executed by the ANG or HQ AFRC). The appropriate ARC headquarters maintains C2 and waiver authority for ARC crews performing any ARC-directed mission prior to mobilization (except associate ARC units); waivers must be obtained from ANG/XO or HQ AFRC/DO, as appropriate.

4.3.5. Non-AMC Missions. For user command assigned aircraft according to Air Force Policy Directive (AFPD) 10-9, (e.g., AETC, AFRC, ANG) waiver authority is the appropriate MAJCOM/DO, or as specified in MAJCOM supplement.

4.4. Technical Assistance Service. The AC may request (at anytime in the decision process) technical support and additional assistance from their home unit, MAJCOM staff, and maintenance representatives.

4.4.1. ACs electing to operate with degraded equipment or aircraft systems (with appropriate waiver) must coordinate mission requirements (i.e., revised departure times, fuel requirements, maintenance requirements, etc.) with the controlling C2 agency before flight.

4.4.2. If beyond C2 communication capability, the AC may deviate from this chapter according to paragraph **1.4.**. Report deviations (without waiver) through channels to appropriate MAJCOM DO/XO within 48-hours. Units must be prepared to collect background information and submit a follow-up written report upon request.

4.4.3. When it is necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required, the AC may deviate from the MEL and this chapter. Report deviations (without waiver) through channels to appropriate MAJCOM DO/XO within 48 hours. Units must be prepared to collect background information and submit a follow-up written report upon request.

4.5. Supplements. Each MAJCOM may supplement the MEL (see **Chapter 1**).

4.6. Definitions (specific to this chapter):

4.6.1. Home Station. Home bases of assignment for C-130 aircraft. Aircraft will not depart their home stations unless MEL home station requirements are met. Exception: During wartime, en route criteria will apply to all aircraft departures.

4.6.2. Enroute. Enroute locations where C-130 maintenance repair capability exists. An enoute station has the necessary skilled USAF, or USAF-contract maintenance personnel, support equipment, and technical data available to accomplish most repairs.

4.6.3. Local Training. A mission that departs home station to perform home station transition training, or airdrop training and returns in the same day.

4.6.4. Off-Station Training. A mission that departs home station to perform training, as directed by the wing commander, without returning the same day. These missions will be supported by deployed home station logistics. ***NOTE***: Off-Station Trainers are considered local training for the purposes of this chapter.

4.7. Navigation Systems.

4.7.1. For flights in Minimum Navigation Performance Specification (MNPS) airspace in the North Atlantic Region or the Composite Hawaii/Mainland US Route System, the following fully operable navigation systems are considered the minimum necessary to permit compliance.

4.7.1.1. SCNS aircraft. Fully operational SCNS, to include the navigator's IDCU and either the pilot or copilot's IDCU.

4.7.1.2. Non-SCNS aircraft. Doppler and INS, or dual INS.

4.7.1.3. Sextant and sextant mount. (Not required on aircraft with integrated GPS or dual INS).

4.7.1.4. Compass systems. When two systems are installed, both should be operational. If one system fails, refer to the flight manual to determine what other equipment is affected.

4.7.2. For flights on all other Category I routes, the AC determines the minimum navigational capability required to safely accomplish the mission. Consider the following: length and route of flight, weather, and experience and proficiency of the crew.

4.7.3. Equipment listed in FLIP AP/2 for permitting compliance with MNPS is mandatory. Loss of any component before track entry requires return to a station with maintenance capability or re-filing via specified routes.

Table 4.1. Engines/Auxiliary Power Unit (APU)/Gas turbine Compressor (GTC).

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Engines	4	4	Do not take off with nonstandard aircraft configuration or power unless a hostile threat to the aircraft and/or crew makes it imperative. Do not take off unless all four engines will achieve takeoff power settings.
Torquemeter	4	4	
Tachometer	4	4	
Turbine Inlet Temperature Indicators	4	4	
Fuel Flow Gauges	4	4	
Oil Temperature Gauges	4	4	
Oil Pressure gauges	4	4	Indicators for both the engine power section and reduction gear section must be operational.
Oil Quantity Gauges	4	3	One oil quantity gauge may be inoperative provided the oil quantity is verified prior to flight and the Low Oil Quantity light is operational.
Low Oil Quantity Light	1	0	If inoperative, all four oil quantity gauges must be operational.
Oil Cooler Flap	4	0	Oil Cooler Flap may be inoperative if the Flap can be manually positioned to open and fixed and oil temperature can be maintained within normal limits.
Oil Cooler Flap Position Indicator	4	0	
APU	1	1	If the APU fails, flight in visual meteorological conditions (VMC) is authorized provided no other electrical malfunctions exist. If the APU generator is inoperative, the generator will be removed and padded prior to operation of the APU.
GTC	1	0	

Table 4.2. Propellers.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Propeller	4	4	Propeller may be operated with a feather override failure where the override button fails to pop out at full feather, (faulty pressure switch) provided maintenance instructions in the applicable fault isolation manual are followed and no other system is affected.
Synchrophaser	1	1	If the synchrophaser fails, mission may continue to a repair facility provided no other portion of the propeller system is affected.

Table 4.3. Electrical System.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Generators, Engine-Driven	4	4	
Generators, Engine-Driven (Enroute)	4	3	If a generator fails at an enroute stop, flight to a destination with repair capability, including enroute stops, may be made. If the AC generator is not equipped with a disconnect, it will be removed and the generator mount padded before flight.
Generators, Engine Driven (Local Training)	4	3	Local training missions may continue after a generator is disconnected or removed and the mount padded, provided no other electrical malfunction exists.
Bus Switching System (BSS)	2	0	
Bus Switching Unit (BSU)	2	1	The #1 BSU must be operational.
Transformer Rectifiers (TR)	4	4	One Essential TR unit may be inoperative for flight to a repair facility provided no other electrical malfunction exists.
ATM and ATM generator/APU Generator	1	1	If the ATM, ATM generator/APU generator fails, flight in visual meteorological conditions (VMC) is authorized provided no other electrical malfunctions exist. APU generator will be removed and padded before operation of the APU.
Generator Out Lights	4	3	(See **NOTE 1**)
AC Loadmeter	4	3	(See **NOTE 1)**

NOTE 1: All associated equipment and indicators will be operational for each operative engine-driven generator (i.e., generator control panel, GCU, voltage regulator, generator out/caution light, AC loadmeter, etc.).

Table 4.4. Fuel Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Main Tank Fuel Pumps	4	4	On aircraft equipped with dump mast shutoff valve switches, one main tank fuel boost pump may be inoperative for flight to a repair facility provided the respective fuel dump pump is operational.
Main Tank Dump Pumps	4	4	
Auxiliary Tank Fuel Pumps (per tank)	1	0	Auxiliary tank fuel pumps should be operational for any tank containing fuel.
External Tank Fuel Pumps (per tank) (if tank contains fuel)	2	1	If one external tank boost pump is inoperative, fuel within that tank will be trapped should the second boost pump fail. Fuel balancing with the opposite tank will then be necessary resulting in a reduction of usable fuel.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Main Fuel Quantity Indicators (Enroute) (See **NOTE 1**)	4	3	One main fuel tank indicator may be inoperative provided: Both the tank with the inoperative indicator and its symmetrical tank quantity are verified by use of a fuel tank dip stick. The fuel tank dip stick is calibrated for JP-4. Use with other fuels is inaccurate for reading pounds of fuel quantity. At enroute stops when engines are shut down, the tank with the inoperative indicator and the symmetrically opposite tank will be dip checked. Crossfeed operation will begin when the symmetrically opposite quantity indicator has decreased to 1,500 lbs (inboards) and 2,500 lbs (outboards). Engine out training using the engine corresponding to the inoperative indicator or its symmetrical opposite will not be conducted during tank to engine operation. Flights consisting of multiple stops when the mission profile does not allow dipping of tanks (i.e., EROs, local trainers) will terminate with a minimum of 8,000 lbs calculated main tank fuel.
Main Fuel Quantity Indicators (Local Training)	4	2	Local training flights may be conducted with two inoperative main tank indicators provided: Inoperative indicators are asymmetrical. Main tanks fuel quantity is visually verified using the fuel tank dip stick. The fuel tank dip stick is calibrated for JP-4. Use with other fuels is inaccurate for reading pounds of fuel quantity. Engine out training is not performed unless all engines are on crossfeed from auxiliary or external tanks with operative indicators. Symmetrical engine fuel flow is maintained. Mission will terminate with a minimum of 8,000 lbs calculated main tank fuel.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
External Fuel quantity Indicator (See **NOTE 1**)	2	0	One external fuel tank indicator may be inoperative provided both external fuel tanks are checked full or empty. Both external fuel tank indicators may be inoperative provided both external tanks are verified empty. When an external tank indicator is inoperative and the tank cannot be visually checked empty due to foam modification, comply with the following prior to flight: Check pressure with each pump in the external tank. If no pressure is obtained, the tank is verified empty. If pressure is obtained, ground transfer the fuel from the external tank. Defuel the external tank if unable to ground transfer. When unable to verify an external tank is empty prior to engine start, the tank will be placed on crossfeed until no pressure is obtained. This will be completed prior to takeoff.
Auxiliary Tank Fuel Quantity Indicators	2	0	If fuel quantity indicator is inoperative, fuel quantity will be verified with the magnetic sight gauge.

NOTE 1: Both a main and external fuel tank indicator may be inoperative on the same wing provided the limitations listed for a single inoperative main fuel tank indicator and a single external fuel tank indicator are followed.

Table 4.5. Hydraulics.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Engine-driven Hydraulic Pumps	4	4	
Utility/Booster System Engine Pump Pressure Warning Lights	4	4	
Utility System Hydraulic Pressure Indicator	1	1	
Booster System Hydraulic Pressure Indicator	1	1	
Hydraulic Suction Boost Pumps	2	2	
Auxiliary Hydraulic Pump	1	1	
Auxiliary Hydraulic Pressure Indicator	1	1	Direct reading gauge in cargo compartment may be inoperative.
Rudder Boost Pressure Indicators	2	1	

Table 4.6. Anti-Ice/De-Ice System.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Ice Detection System	1	1	(See **NOTE 1**)
Pitot-Heat System	2	2	
TAS Probe Heat	1	1	
Wing/Empennage Anti-Icing System	2	2	(See **NOTE 1**)
Engine Inlet Air Duct Anti-Icing Systems	4	4	(See **NOTE 1**)
Leading Edge Temperature Indicators	6	6	
Wing Leading Edge and Wheel Well Overtemperature Warning Lights	7	7	
Propeller Anti-Icing and Deicing Systems	4	0	Blade De-Icing will be operational for flight into known or forecast icing conditions.
Windshield Anti-Icing Systems	2	2	(See **NOTE 1**)
Radome Anti-icing System (AWADS)	1	1	May be inoperative for flights, which do not require radar.

NOTE 1: System may be inoperative provided aircraft is not operated in known or forecast icing conditions.

Table 4.7. Brake/Anti Skid Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Wheel Brakes	4	4	
Anti-Skid (Home Station/Enroute)	1	1	The antiskid may be inoperative for flight to a destination with repair capability, including enroute stops. Assault landings with antiskid inoperative are not authorized.
Anti-Skid (Local Training)	1	1	A local training flight may continue if the antiskid fails provided the system is turned off. Multiple landings or formation landings should not be accomplished. Assault landings with antiskid inoperative are not authorized.

Table 4.8. Flight Recorder/Locating Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Flight Data Recorder	1	1	
Cockpit Voice Recorder (CVR)	1	1	
Emergency Locator Transmitter	1	1	
Underwater Acoustical Locator Beacon (UAB)	1	1	

Table 4.9. Fire Protection/Warning Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Fire Extinguisher System	2	2	Both bottles will be serviceable.
Engine Fire and Turbine Overheat Warning Systems	4	4	
Nacelle Overheat System	4	4	
GTC/APU Fire Warning System	1	1	

Table 4.10. Air Conditioning, Pressurization and Bleed Air.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Flight Deck and Cargo Compartment Air Conditioning Units	2	2	Pressurization and both air conditioning systems should be operational for special weapons missions. Pressurization and both air conditioning systems are normally essential if passengers or patients are carried. If a system fails, flight to a destination with repair capability (including enroute stops) may be accomplished (coordinate with the senior medical AECM when patients are carried). Passengers and patients will be briefed on the possibility that discomfort may be encountered. Air conditioning and pressurization are not required for low-level missions if a reasonable temperature can be maintained.
Flight Deck Auxiliary Vent Valve	1	1	
Cargo Compartment Auxiliary Vent Valve	1	0	
Flight Deck/Cargo Compartment Temperature Control System	2	2	Automatic system may be inoperative provided manual temperature control is operable. Manual system may be inoperative provided automatic temperature control is operable.
Under Floor Heat System	1	0	May be inoperative provided regulation of cargo compartment temperature is not a mission requirement.
Cabin Pressure Controller	1	1	Automatic controller may be inoperative for pressurized flight provided the manual controller is operative. May be inoperative for unpressurized flight.
Cabin Altimeter	1	1	May be inoperative for unpressurized flight.
Cabin Differential Pressure Indicator	1	1	May be inoperative for unpressurized flight.
Cabin Rate of Climb Indicator	1	1	May be inoperative for unpressurized flight. Must be operational for pressurized flight if patients are carried.
Emergency De-Pressurization Switch	1	1	

Table 4.11. Landing Gear.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Landing Gear System	1	1	If a landing gear malfunction is encountered, make a full stop landing and troubleshoot the malfunction before continuing the mission. If repair capability does not exist and further flight can be made with the gear down and locked, the aircraft may be flown to a destination with repair capability (including enroute stops), provided the gear is not moved from the down and locked position. Flight (including enroute stops) with landing gear doors removed may be accomplished to a destination with repair capability.
Landing Gear Position Indicators	3	3	
Landing Gear Warning Light	1	1	
Parking Brake	1	1	

Table 4.12. Flight Instruments.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Airspeed Indicator	2	2	
Vertical Velocity Indicator or Vertical Velocity Speed Indicator	2	2	Vertical velocity indication may be inoperative on one indicator except for flights in RVSM airspace.
Flight Director Systems	2	2	
Attitude Director Indicator (ADI)	2	2	
Standby ADI (if installed)	1	1	
Horizontal Situation Indicators	2	2	
EFI Displays (if installed)	4	3	
BDHI	3	0	
Standby ADI	1	1	
Barometric Altimeters	3	2	Both pilots' altimeters must be operational.
CARA (pilot's indicator)	1	0	Always required if carrying passengers/troops.
GPWS (if equipped)	1	0	Always required if carrying passengers/troops.
GCAS (if equipped)	1	0	Always required if carrying passengers/troops.
TCAS (if equipped)	1	0	Always required if carrying passengers/troops.
Central Air Data Computer (if installed)	1	1	
#1 UHF Manual Control Head Radio (SCNS only)	1	1	
Central Air Data Computers (CADC)	1	1	

Table 4.13. Navigation Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Standby Magnetic Compass	1	1	
Heading Systems	2	1	
NAV SELECTOR Panel	2	2	
VOR	2	1	
ILS	2	1	

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
NDB	2	1	
TACAN	2	1	
Radar	1	0	Required if thunderstorms or hazardous conditions that can be detected by airborne radar are forecast or exist along route of flight.
H3 (if equipped with two radars)	2	0	Pilot's radar required for flight if known or forecast thunderstorms are expected along the route of flight or at night.
IFF/SIF	1	0	As required for ATC and mission requirements. (See NOTE 1)

NOTE 1: Perform a ground check of the IFF before takeoff, using either the self test or ground radar interrogation. If self test is unacceptable and radar facilities do not permit a ground check, you may take off if the IFF was operational on the previous mission. Aircraft will not depart with an IFF known to be inoperative. ***EXCEPTIONS:*** Formations must have at least one operational IFF per element. Single aircraft must have the approval of ATC and the MAJCOM DO/XO.

Table 4.14. Aircraft Exterior/Interior Lighting.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Landing Lights	2	1	One may be inoperative provided the taxi light on same side is operational.
Taxi Lights	2	1	One may be inoperative providing the landing light on the same side is operational.
Formation Lights	9	0	Not required for daylight operations. Two lights per wing will be operational for night formation flights.
Navigation Lights	6	3	For night operations, the left and right wingtip Nav lights must be operational in addition to one of the white lights on the tail cone.
Anti-Collision/Strobe Lights	2	2	
Wing Leading Edge Lights	2	0	
Primary Instrument Cockpit Lighting	1	0	(See **NOTE 1**)

NOTE 1: All edge "peanut" lighting or backlit lighting (depending on aircraft model) will be operational for night operations for the following instruments; airspeed, altimeters, VVI/VVSI, ADI, and HSI.

Table 4.15. Doors and Ramp Systems.

Item/System	Installed	Operational	Remarks/Limitations/Exceptions
Ramp and Ramp Locking System	1	1	Warning light, latching mechanisms, and locking system will be operative for pressurized flight. Aircraft will not be released for flight with a malfunctioning ramp lock system, with cargo on the ramp. Aircraft may continue to destination if ramp locks malfunction in-flight. Cargo ramp will not be operated in flight, with cargo on the ramp, with malfunctioning locks. Repair lock malfunction or remove cargo from ramp prior to continuing flight operations. Do not pressurize the airplane if the ramp locks fail to lock. Unpressurized flight, with no cargo on the ramp, may be performed with a cargo ramp lock malfunction when mission requirements dictate.
Aft Cargo Door and Locking System	1	1	Pressurized flight may be performed with a aft cargo door lock malfunction when mission requirements dictate.
Crew Entrance Door and Warning Light	1	1	

Chapter 5

OPERATIONAL PROCEDURES

5.1. Checklists. A checklist is not complete until all items have been accomplished. Momentary hesitations for coordination items, ATC interruptions, and deviations specified in the flight manual, etc. are authorized. Notes amplifying checklist procedures or limitations may be added to the checklists (in pencil).

5.1.1. Checklist Inserts. Units may supplement T.O. guidance with approved checklist inserts according to AFI 11-215, *Flight Manual Program (FMP*) and the appropriate MAJCOM supplement. Place the inserts at the end of the appropriate checklist or in an in-flight guide. All checklist inserts must have a point of contact (POC). If any crew member has recommendations or changes they should contact the POC. The POC will consolidate inputs and submit changes to MAJCOM Stan/Eval (HQ AMC/DOV) for approval. Local in-flight guides and inserts not affecting T.O. guidance and procedures may be locally developed and with OG-level Stan/Eval approval.

5.1.2. Amplified Tactical Checklist. Simultaneous or coordinated procedures are arranged in parallel columns and chronologically numbered in sequence of the various operations. When an amplified checklist item is followed by a crew position designator (for example "P"), that crewmember takes action and responds to the checklist challenge.

5.1.3. Abbreviated Tactical Checklist. The cockpit crew checklist is a challenge and response checklist. The cockpit crew and loadmaster checklists contain both challenge and non-challenge items. Responses to challenge items on the cockpit crew checklist are in quotes. Release point and completion of drop checklists are initiated by the unchallenged command "Green Light" or "Red Light" by the navigator as appropriate. Loadmasters will respond at the end of each phase of their checklists without challenge.

5.1.4. Abbreviated checklists items that do not apply to the unit's aircraft or mission may be lined out. Do not challenge these items during checklist accomplishment.

5.2. Duty Station. A qualified pilot will be in control of the aircraft at all times during flight. (***EXCEPTION***: Unqualified pilots undergoing qualification training and senior staff members who have completed the Senior Staff Familiarization Course). All crewmembers will be at their duty stations during all takeoffs, departures, low levels (below MSA), airdrops, approaches, and landings. During other phases of flight, crewmembers may leave their duty stations to meet physiological needs and perform normal crew duties. Only one pilot, or the flight engineer, may be absent from their duty station at a time. Notify the AC prior to departing assigned primary duty station.

5.3. Flight Station Entry. ACs may authorize passengers and observers access to the flight station during all phases of flight. In all cases, sufficient oxygen sources must be available to meet the requirements of AFI 11-202V3. Passengers and observers will not be permitted access to the pilot, copilot, navigator or flight engineer position regardless of its availability.

5.4. Takeoff and Landing Policy. The pilot in command will occupy either the left or right seat during all takeoffs and landings. Instructor pilots may takeoff or land from either seat. Comply with the ASRR.

5.4.1. An instructor pilot or AC will make all takeoffs and landings from the left seat during:

5.4.1.1. Airlift of nuclear weapons.

5.4.1.2. Aircraft emergencies, unless conditions prevent compliance.

5.4.1.3. Formation departures and recoveries except for instructor upgrade training, evaluations, currency, or proficiency.

5.4.1.4. Assault or substandard airfield operations. ***EXCEPTION:*** Instructors providing upgrade training, receiving an evaluation, gaining currency, or proficiency.

5.4.1.5. Missions operating in areas of hostile activity.

5.4.1.6. Situations when in the opinion of the AC, marginal conditions exist.

NOTE: AC upgrade candidates may occupy the left seat on formation departures/recoveries and assault or substandard airfield operations with an instructor pilot (IP) in the right seat.

5.4.2. ACs who possess less than 100 PAA hours since certification in the C-130 will perform all takeoffs and landings from the left seat. ***EXCEPTION:*** They may allow ACs or higher to perform takeoffs and landings when required for currency.

5.4.3. Copilot Landing Policy. Copilots may takeoff or land from the right seat if an AC with over 100 PAA hours occupies the left seat or from either seat if an instructor or flight examiner occupies the other seat.

5.5. Landing Gear and Flap Operating Policy. The landing gear will be operated by the pilot in the right seat. Actuate the landing gear only after command of the pilot flying the aircraft. Prior to actuation of the landing gear, the other pilot will acknowledge the command by repeating it. The flaps will be operated by the pilot not flying the aircraft. Actuate the flaps only after command of the pilot flying the aircraft. Prior to actuation of the flaps, the other pilot will acknowledge the command by repeating it.

5.6. Outside Observer. When available, use a crew member to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000 feet MSL.

5.7. Seat Belts.

5.7.1. All occupants will have a designated seat with a seat belt. Use of seat belts will be as directed by the AC and **Chapter 13**.

5.7.2. Primary crewmembers occupying pilot, copilot, navigator, flight engineer, or loadmaster positions will have seat belts fastened at all times in-flight, unless crew duties dictate otherwise.

5.7.3. All crewmembers will be seated with seat belts and shoulder harnesses fastened during taxi, takeoff, and landing, unless crew duties dictate otherwise (the flight engineer is exempt from wearing the shoulder harness for ground operations). ***EXCEPTION:*** Crewmembers may taxi without the shoulder harnesses fastened for positioning and de-positioning the aircraft. Crewmembers performing instructor or flight examiner duties are exempt from seat belt requirements; however, a seat with an operable seat belt will be assigned.

5.7.4. Litter patients, actual or simulated, may remain secured on litters for takeoff and landing.

5.7.5. Infant car seats are required for children under the age of two (reference 13.4.2.5. for specific information). Adults will not hold infant seats during any phase of flight.

5.8. Aircraft Lighting. In accordance with **Chapter 4** of this AFI, AFI 11-202V3 and applicable T.O.s.

5.8.1. Unless otherwise directed the aircraft strobe lights will be operated as follows:

5.8.1.1. "Before Starting Engines" Checklist, "red" position.

5.8.1.2. "Lineup" Checklist, "white" for day, night single-ship, and day formation. "red" for night formation.

5.8.1.3. "After Landing" Checklist, "red" position.

5.9. Portable Electronic Devices. Use AFI 11-202V3 requirements.

5.10. Smoking Restrictions. Smoking is prohibited on board the aircraft.

5.11. Advisory Calls: The pilot flying will periodically announce intentions during departures, arrivals, approaches, and when circumstances require deviating from normal procedures. Mandatory advisory calls are: (The pilot not flying the aircraft will make these calls except those designated for any crewmember).

5.11.1. Takeoff. State "GO" at refusal speed or takeoff speed, whichever is lower. Any crewmember noting a safety of flight malfunction before hearing "GO" will state "REJECT" and a brief description of the malfunction (e.g., "Reject, number two engine flameout.").

5.11.2. Altitude calls:

5.11.2.1. 1000 feet above initial approach fix (IAF) (or holding) altitude

5.11.2.2. Transition altitude/level.

5.11.2.3. One thousand feet above/below assigned altitude.

5.11.2.4. One hundred feet above/below assigned altitude to include minimum descent altitude/ decision height (MDA/DH).

5.11.3. Approaches:

5.11.3.1. Call one hundred feet above procedure turn, final approach fix (FAF), MDA, or DH altitude.

5.11.3.2. Non-precision approaches.

5.11.3.2.1. “Minimums” when reaching MDA.

5.11.3.2.2. "Runway in sight." Call when the runway environment is in sight. Do not call too soon when obstructions to vision, such as fog, haze, low stratus clouds, etc., are present.

5.11.3.2.3. "Go-around." Call at missed approach point if the runway environment is not in sight or if the aircraft is not is a position for a safe landing.

5.11.3.3. Precision approaches.

5.11.3.3.1. "Land." Call at DH if runway environment is in sight and the aircraft is in a position for a normal landing.

5.11.3.3.2. "Go-around." Call at DH if the runway environment is not in sight or if the aircraft is not in a position for a safe landing.

5.11.4. Deviations.

5.11.4.1. The pilot not flying the aircraft will tell the other pilot when heading or airspeed deviations are observed or altitude is more than 100 feet from desired, and no attempt is being made to correct the deviation.

5.11.4.2. Any crewmember seeing a variation of 200 feet altitude, a deviation of +/- 10 knots in airspeed or a potential terrain or obstruction problem will immediately notify the pilot. Deviations from prescribed procedures for the approach being flown will also be announced.

5.12. Communications Policy. The Air Force does not give a promise of confidentiality to aircrews regarding their recorded aircraft crew communications. Crewmembers are expected to maintain a high degree of cockpit professionalism and crew coordination at all times.

5.12.1. Sterile Cockpit. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, approach, landing, and any flight below 10,000 feet MSL (except cruise).

5.12.2. Aircraft Interphone. Primary crewmembers will monitor interphone during critical phases of flight. Crewmembers will advise the AC prior to checking off interphone.

5.12.3. Command Radios:

5.12.3.1. The pilot not flying the aircraft normally makes all air traffic control (ATC) radio calls.

5.12.3.2. In terminal areas the pilot, copilot, navigator, flight engineer, and loadmaster (if able) will monitor the command radio unless directed otherwise. A designated crew member should monitor C2 frequencies (if applicable) on the inbound and outbound leg, unless otherwise directed.

5.12.3.3. The pilot operating the radios will notify the crew which radio is primary, and update the crew when the primary radio changes.

5.12.3.4. One pilot should record and will acknowledge all ATC clearances. The navigator or communications systems operator will also record the clearance. The navigator or communications systems operator (if applicable) will monitor the read back and ensure compliance with all clearances. Disregard this procedure when air traffic ATC instructions require immediate execution, or when such action interferes with timely completion of more important duties.

5.12.3.5. Both pilots will monitor UHF guard (or VHF guard when appropriate) emergency frequency regardless of primary radio.

5.12.4. Crew Resource Management (CRM) Assertive Statement “Time Out":

5.12.4.1. "Time Out" is the common assertive statement for use by all crewmembers. The use of "Time Out" will:

5.12.4.1.1. Provide a clear warning sign of a deviation or loss of situational awareness.

5.12.4.1.2. Provide an opportunity to break the error chain before a mishap occurs.

5.12.4.1.3. Notify all crewmembers that someone sees the aircraft or crew departing from established guidelines, the briefed scenario, or that someone is simply uncomfortable with the developing conditions.

5.12.4.2. As soon as possible after a "Time Out" has been called, the aircrew will take the following actions:

5.12.4.2.1. Safety permitting, stabilize the aircraft.

5.12.4.2.2. The initiating crew member will voice his or her concerns to the crew.

5.12.4.2.3. The AC will provide all other crewmembers with the opportunity to voice inputs relative to the stated concerns.

5.12.4.2.4. After considering all inputs, the AC will direct the aircrew to continue the current course of action or direct a new course of action.

NOTE: The AC is the final decision authority.

5.13. Transportation of Pets. Transporting pets (dogs and cats) on aircraft in conjunction with the sponsors permanent change of station is authorized. Other pets or animals are normally prohibited, but may be moved according to DOD-R 4515.13.

5.14. Alcoholic Beverages. MAJCOM DO/XO may authorize the dispensing of alcoholic beverages.

5.15. Runway, Taxiway and Airfield Requirements; Wind Restrictions; Runway Condition Reading (RCR) Limitations: A current landing zone (LZ) survey (within the past five years as specified in AFI 13-217) is needed prior to using other than hard-surfaced runways or taxiways. MAJCOM DO/XO may waive runway/taxiway width requirements. Runway and Taxiway Widths. Minimum runway and taxiway widths for normal and tactical airland operations are depicted in **Table 5.1.**.

Table 5.1. Runway/Taxiway Width Requirements.

Runway Operations	**Width**
Normal Operations	80 Feet/25 Meters
Tactical Assault Operations	60 Feet/19 Meters
Taxiway	
Normal and Tactical Assault Operations	30 Feet/9 Meters

5.15.1. For mission accomplishment, if approach end overruns are available and stressed or authorized for normal operations, they may be used to increase the runway available for takeoff. Departure end overruns (if stressed and authorized) may also be used for landing if needed. Consult with HQ AMC/DOVS (Airfield Analysis Branch) for suitability guidance.

5.15.1.1. Do not land on (touchdown on) approach end arresting cables (does not include recessed cables). If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected.

5.15.1.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, automated terminal information service (ATIS), or ATC.

5.15.1.3. Operations are authorized on runways where BAK-12 systems are installed, with an eight point cable tie-down system, without regard to the Dash-One Caution. When operating from runways equipped with other types of systems, or if it is unknown if the BAK-12 system includes eight point tiedowns, aircrews should recognize the increased risk of damage to the aircraft.

5.15.2. Aircrews and planning agencies will contact HQ AMC/DOVS for all questions pertaining to airfield weight bearing capability and will review the ASRR prior to all off-station operations. HQ AMC/DOVS is the waiver authority for all airfield restrictions on AMC missions. Waivers must be obtained prior to mission execution. Although a waiver may be approved, the AC is still responsible for determining airfield suitability based upon operational need. See the ASRR for airfield certification requirements.

5.15.3. Runway Length for Takeoff and Intersection Takeoffs. Normally, takeoffs will be initiated from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the AC.

5.15.3.1. Intersection takeoffs may be accomplished provided the operating environment (i.e., gross weight, obstructions, climb criteria, weather, etc.) will allow a safe takeoff and departure.

5.15.3.2. When less than the entire runway is used, takeoff and landing data computations will be based on the actual runway remaining from the point at which the takeoff is initiated.

5.15.4. Runway Length for Takeoff. Minimum runway length for a normal take off is critical field length.

5.15.4.1. Runway Length for Landing. Minimum runway for a normal landing is landing distance from 50 feet over the threshold, plus the runway visual range (RVR)/visibility correction factor specified in **Table 5.2.**.

Table 5.2. RVR/Visibility Correction Factors.

RVR (Visibility):	Add to Landing Distance:
Less than 40, (3/4)	1,000 feet.
Equal to or greater than 40, (3/4)	500 feet.

5.15.5. RCR Limitations. When no RCR is available, refer to the flight manual for standard ICAO conversions based on general runway condition. Be conservative when dealing with unknown conditions (e.g., FOBs, unpaved runways). Normally, RCR values are not reported for taxiways and ramps. During periods of reported low RCR, the taxiways and ramps may have an even lower RCR than reported for the runway. Consider the runway surface wet when water on the runway causes a reflective glare.

5.15.5.1. RCR and Runway Surface Condition (RSC). The performance charts used to determine braking action are based on concrete runways. The RCR values for the following runway surfaces in **Table 5.3.**, are estimates based on operational experience and should be used only as a guide.

Table 5.3. RCR Values.

TYPE SURFACE	RCR (DRY)	RCR (WET)
Asphalt	23	12
Aluminum Matting	20	10
M8A1/With Anti-Skid (PSP)	20	8
M8A1/Without Anti-Skid (PSP)	13	3
Clay	16	5
Crushed Rock	16	5

5.15.5.2. Limit C-130 operations into and out of slush or water covered runways to a covering of one inch. This number is based on performance charts where an RSC of 10 is equal to one inch of slush or water. Performance data where more than one inch of slush or water is present may not be accurate.

5.15.6. Wind Limitations. All tactical assault operations must fall in the "recommended" area of charts unless otherwise approved by OG/CC.

5.15.7. Minimum runway for an assault takeoff is charted minimum field length for maximum effort takeoff (corrected for one-engine Vmca if applicable). Peacetime restrictions: do not use runways less than 3,000 feet long, unless waived by MAJCOM/DO or designated representative.

5.15.7.1. Takeoff at Vmca (Vmca in ground effect) or maximum effort takeoff speed (Vmeto), depending on mission requirements/runway environment. Climb until clear of the real or simulated obstacle at Vmca + 10 knots, if Vmca is used for takeoff, or max effort obstacle clearance speed, if Vmeto is used for takeoff.

5.15.7.2. If obstacles are a factor, use Vmeto and max effort obstacle clearance speed without Vmca corrections.

5.15.7.3. The pilot will ultimately make the decision to use Vmeto or Vmca based on a consideration of all available data including: weather, runway length, Vmeto, Vrefusal, Vmca, Vmcg, applicable airfield survey, and a review of hazards, obstructions, and terrain both laterally and along the climb out flight path. Peacetime restrictions: take-off at Vmca or Vmeto, which ever is greater unless actual obstacles are a factor.

5.15.8. Minimum runway for an assault landing is ground roll plus 500 feet. Peacetime restrictions:

5.15.8.1. Compute landing performance with two engines in reverse, two engines in ground idle, and full brakes.

5.15.8.2. Do not use runways less than 3,000 feet long unless waived by MAJCOM/DO or designated representative.

5.16. Aircraft Taxi and Taxi Obstruction Clearance Criteria and ForeignObject Damage (FOD) Avoidance.

5.16.1. Without wing walkers, avoid taxi obstructions by at least 25 feet. With wing walkers, avoid taxi obstructions by at least 10 feet.

EXCEPTION: According to AFI 11-218, *Aircraft Operations and Movement on the Ground*, aircraft may taxi without marshalers/wing walkers at home station along locally established taxi lines which have been measured to ensure a minimum of 10 feet clearance from any obstruction.

5.16.2. When taxi clearance is doubtful, use one or more wing walkers. If wing walkers are unavailable, deplane one or more crewmembers to maintain obstruction clearance and provide marshaling. Use AFI 11-218 signals. The AC should use wing walkers, deplaned crewmembers, or a crew member on interphone positioned at the paratroop door(s) to act as an observer while maneuvering on narrow taxiways. During night taxi operations, marshalers will have an illuminated wand in each hand. Observers should be in a position to see wing walkers at all times (through door or windows) and communicate with the pilot.

5.16.3. FOD Avoidance. Make every effort to minimize the potential for engine FOD. Crews should:

5.16.3.1. Carefully review airfield layout during mission planning. Be familiar with taxi routes, turn requirements, and areas for potential FOD.

5.16.3.2. Minimize power settings during all taxi operations.

5.16.3.3. Use low speed ground idle whenever possible.

5.16.4. After landing and clearing the runway, and with approval of the pilot, the loadmaster may open the aft cargo door and lower the ramp to approximately 12 inches above horizontal to prepare for cargo off/onload provided equipment, cargo, and passengers remain secure in the cargo compartment.

5.16.5. Reverse Taxi:

5.16.5.1. The pilot will coordinate reverse taxi directions and signals to be used with the loadmaster and marshaller (when available).

5.16.5.2. Secure all cargo and ensure all passengers are seated.

5.16.5.3. Open the aft cargo door and lower the ramp to approximately 12-inches above horizontal.

5.16.5.4. The loadmaster will be on the aircraft ramp in the best position to direct reverse taxi, report any hazards, and to provide the pilot with timely interphone instructions on turns, distance remaining, conditions of the maneuvering area, and stopping point.

5.16.5.5. Stop no less than 25-feet from an obstruction even if using a wing walker.

5.16.6. During night reverse taxi operations, the pilot and loadmaster will ensure the taxi area is sufficiently lighted.

5.17. Not Used.

5.18. Fuel Jettison Procedures. Fuel jettison is limited to the minimum necessary for safe and effective flight operations. Except in the case of an emergency, prior to jettisoning fuel, crews will notify the appropriate ATC or flight service facility of intentions, altitude, and location. Inform the appropriate ATC or flight service facility when the operation is complete.

5.18.1. Use designated jettison areas to the maximum extent possible, except when safety of flight would be compromised.

5.18.2. If jettison is accomplished, record all pertinent data to include flight conditions, altitude, airspeed, air temperature, wind direction and velocity, type and amount of fuel, aircraft type and position at time of jettison, time and duration of jettison activity, and reason jettison was accomplished. Retain this information for 6 months as documentation in the event of claim against the government resulting from the fuel jettison.

5.19. Not Used.

5.20. BASH Programs. BASH programs are centralized unit efforts that provide information cross-feed, hazard identification, and a consolidated course of action. As a minimum, units must implement the following procedures:

5.20.1. Ensure compliance with the following Bird Watch condition restrictions.

5.20.1.1. Bird Watch Condition Low - No operating restrictions.

5.20.1.2. Bird Watch Condition Moderate - Initial takeoffs and final landings allowed only when departure and arrival routes will avoid bird activity. Local IFR/VFR traffic pattern activity is prohibited.

5.20.1.3. Bird Watch Condition Severe - All takeoffs and landings are prohibited. Waiver authority is local OG/CC or equivalent. Parent MAJCOM/DO waiver is required to operate at airfields not controlled by the MAF.

5.20.2. Make every effort to not schedule takeoffs, landings, and low-levels from one hour before to one hour after sunrise and sunset during the phase II period. In addition, significant bird hazards will be published in FLIP GP and the IFR Supplement along with the associated airfield operating hour restrictions and avoidance instructions.

5.20.3. All AMC units will have a BASH Reduction Plan in accordance with AFI 91-202. AMC tenant units will work with the host base to create a plan.

5.20.4. When operating at airfields where no BASH program exists, AC's have the authority to delay takeoffs and arrivals due to bird condition. Coordinate actions through appropriate C2 authority.

5.20.5. Howard AFB, Panama has singularly distinctive BASH considerations. Ensure AMC crews comply with AFPAM 91-212/AMC1.

5.20.6. The aircrew should consider bird migratory patterns during the enroute portion of the mission to help minimize the potential of an in-flight bird strike. The Bird Avoidance Model (BAM) on HQ AFSC/SEF www site (http://www-afsc.saia.af.mil/AFSC/Bash/home.htm) provides BASH information including regionalized CONUS bird migration patterns, PFPS software overlay, and the latest news. See AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*, for additional information.

5.21. Functional Check Flights (FCFs) and Acceptance Check Flights (ACFs). FCFs and ACFs will be performed according to T.O. 1-1-300 and AMCI 21-201 (or applicable MAJCOM instruction). Additional guidance can be found in T.O.s 00-20-6, and 1C-130(B)-6CF-1.

5.21.1. Terms and Abbreviations.

5.21.1.1. FCFs are performed after accomplishing inspections or maintenance to assure the aircraft is airworthy and capable of mission accomplishment.

5.21.1.2. ACFs specify guidelines for accepting depot aircraft and to determine compliance with contractual requirements (e.g., C checks).

5.21.2. FCF Restrictions.

5.21.2.1. In accordance with T.O. 1C-130X-6CF-1, conditions requiring an FCF include (but are not limited to) major retrofit modifications, removal or replacement of moveable flight control surfaces, major repairs that would affect the flying characteristics of the aircraft, adjustment, removal or replacement of major components of the flight control system for which airworthiness cannot be verified by maintenance operational checks, or removal or replacement of any three engines.

5.21.2.2. The OG/CC is responsible for the wing FCF program. The OG/CC may waive a complete FCF and authorize an FCF to check only those systems disturbed by maintenance, inspection or modification. Additional guidance should be published in the local chapter of these instructions.

5.21.2.3. Check flight will be conducted within the designated check flight airspace of the base from which the flight was launched except when the flight must be conducted under specific conditions, not compatible with local conditions and area restrictions.

5.21.2.4. The decision to approve a combined FCF and ferry flight is the responsibility of the MAJCOM/DO (ANG/DO for ANG mission).

5.21.2.5. FCFs will be accomplished by the best qualified instructor or Stan/Eval aircrews, which will be designated FCF qualified to their assigned aircrew position by the OG/CC in a letter.

5.21.2.6. FCFs will normally be conducted in daylight, VMC conditions. However, the OG/CC may authorize a flight under a combination of VFR, IFR, and "VFR on Top" conditions. The flight will begin in VFR conditions. If the aircraft and all systems are operating properly, it may proceed IFR to penetrate cloud cover to VFR on top to continue the altitude phase of the flight.

5.21.2.7. FCF aborts: If a malfunction occurs during an FCF, which is not related to the condition generating the FCF, and the original condition operationally checks good, the aircraft may be released for flight.

5.21.2.8. OG/CC or deployed mission commander may authorized temporary waivers to these FCF procedures for aircrew qualification when operationally necessary. Permanent waivers require AMC approval.

5.22. Participation in Aerial Events. See AFI 11-209, *Air Force Participation in Aerial Events*, and the appropriate MAJCOM supplement and the following: Aerial events must be sanctioned and individually approved by the appropriate military authority, and dated with the Federal Aviation Administration (FAA). AFI 11-209 identifies events sanctioned for support, and specifies the approval authority for each type. In addition, it stipulates that units participating in aerial events will ensure activities are coordinated with the FAA through the regional Air Force representative.

5.23. Hand-held GPS (not required for aircraft equipped with integrated GPS). Carry a hand-held GPS on every mission, including local and off-station training missions. ***EXCEPTION***: A Hand-held GPS is not required for a local mission without passengers). The hand-held GPS, when operating properly, can provide useful information; however, it must never be used as the primary IFR navigation source. Use of any hand-held GPS receiver that has not been EMI certified is restricted to operations above 10,000 feet AGL only ***NOTE***: MAJCOMs maintain a list of Hand-held GPSs certified for operations below 10,000 feet AGL). Any type of Hand-held GPS may be used above 10,000 feet unless interference is noted with any aircraft system. The actual use of the Hand-held GPS rests with the aircrew. Its usage must never jeopardize safety. When aircrews deploy with or without an aircraft (stage crews), each crew will deploy with a hand-held GPS. This would include KLX-100, PLGR, Garmin and Magellan GPS units.

5.23.1. Before using the hand-held GPS in-flight, aircrew members must receive training and aircraft must be capable of supporting the Hand-held GPS equipment.

5.23.2. The hand-held GPS will not be used to update navigation equipment (SCNS/INS) unless the hand-held GPS position can be confirmed by another aircraft source (i.e. radar, TACAN, VOR, or navigator).

WARNING: Electrical problems have been reported on KLX-100 units. It is extremely important to insert all of the batteries in the proper orientation as shown in section 1.1.2, Figures 1-11 through 1-17 of the operator's guide. The manufacturer confirms that if only one battery is inserted incorrectly, the unit will operate for 10-30 minutes. An increase in temperature may be noted followed by a crackling sound as the battery expands and ruptures. Be extremely careful as battery acid may leak from the bottom of the unit. A way to double-check proper insertion is to go to the GPS Setup page and check the bar graph showing battery power. Make sure it reflects battery strength near 100%. If a problem is detected, shut down the GPS immediately and disconnect unit from any external power source. Report the incident through proper channels. Do not attempt to remove the batteries. This action could cause injury to the individual and will impair investigation for warranty claims.

5.24. Traffic Alert and Collision Avoidance System (TCAS).

5.24.1. It is imperative to follow resolution advisories (RA) to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. If possible, visually clear the airspace before maneuvering the aircraft in response to a TCAS advisory.

5.24.2. Advise ATC as soon as practical when a deviation becomes necessary due to a TCAS RA.

5.25. Radar Altimeter.

5.25.1. Any crewmember detecting the illumination of the radar altimeter Low Altitude warning light will immediately notify the pilot flying the aircraft. Terrain clearance and aircraft position must be verified.

5.25.2. Prior to departure set the radar altimeter for emergency return. Normally, use the height above touchdown/height above aerodrome (HAT/HAA) for IMC, or 500 feet for VMC departures.

5.25.3. The navigator and pilot will use the same radar altimeter setting unless briefed otherwise.

5.25.4. The radar altimeter will be set to the HAT/HAA during instrument approaches.

5.26. Buddy and Windmill Taxi Starts. Buddy and windmill taxi starts may be performed when approved by the OG/CC or DIRMOBFOR. This authority may be delegated to the squadron or mission commander when the unit is deployed. This authorization will not be construed to allow repeated buddy or windmill starts at various scheduled enroute stops. Nonessential crewmembers and all passengers will be loaded after completion of a buddy or windmill taxi start. Buddy starts should have priority over windmill taxi starts.

5.27. Reduced Power Operations. Takeoffs will normally be made using reduced power. Values listed below are the minimum required. Other power settings may be used as mission requirements dictate or permit.

5.27.1. Reduced power operations for normal takeoffs and takeoffs from stop/touch-and-go landings will use a predicted torque corresponding to 900-degrees TIT not to exceed 19,600 inch-pounds of torque. Power settings up to maximum power may be used during stop-and-go takeoffs to comply with training restrictions listed in this chapter. Maximum continuous power (970-degrees TIT for aircraft with dash 15 engines) should be used to takeoff and climb to cruise altitudes.

5.27.2. Reduce power for formation takeoffs to a torque corresponding to maximum continuous power (970-degrees TIT for aircraft with dash 15 engines). Formation leaders will brief takeoff torque when different series C-130 aircraft are in the same formation.

5.27.3. Do not exceed maximum continuous power (932-degrees for dash 7 engines or 970-degrees for dash 15 engines) during cruise. Cruise at a constant 280 KTAS (300 KTAS for dash 15 engines), adjusting TIT at least every hour. For legs of 2.0 hours or less, consider cruise at 260 or 270 KTAS (280 or 290 for dash 15 engines). On short legs with cruise altitude under 10,000 MSL, IAS should be limited to 210 or less. When mission is time rather than distance critical (e.g. aeromedical/overwater training missions) fly at the lowest practical TAS cruise profile.

5.27.4. Reduced power is not authorized for assault takeoffs.

5.28. Aircraft Recovery from Unprepared Surfaces. Aircrews will normally not attempt to recover an aircraft after inadvertent entry onto unprepared surfaces not suitable for taxi. Using the appropriate equipment, ground crews will accomplish aircraft recovery. Unless an emergency situation dictates otherwise, aircrews may only accomplish recovery if there is no aircraft damage, the surface will support the aircraft, and the AC has coordinated with appropriate MAJCOM headquarters maintenance authorities through the TACC. Use the appropriate AFRC NAF/DO for AFRC aircraft or missions, ANG/DO for ANG aircraft or missions, or as specified in MAJCOM supplement.

Chapter 6

AIRCREW PROCEDURES

Section 6A—Pre-Mission

6.1. Aircrew Uniform.

6.1.1. Wear the aircrew uniform, as outlined in AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel* and the appropriate MAJCOM supplement, on all missions, unless otherwise authorized. When the Foreign Clearance Guide (FCG) requires civilian attire, wear conservatively styled civilian clothing.

6.1.2. Each group commander will determine clothing and equipment to be worn or carried aboard all flights commensurate with mission, climate, and terrain involved.

6.1.2.1. All crewmembers will have Nomex gloves in their possession.

6.1.2.2. It is recommended that primary crewmembers wear Nomex gloves during engine start, takeoff, and landing.

6.1.2.3. Crewmembers will remove rings and scarves prior to performing aircrew duties.

6.1.3. Personnel will have the appropriate items of clothing in their possession when flying in Arctic and Antarctic regions.

6.1.4. See AFI 10-403, *Deployment Planning*, for mobility requirements.

6.2. Personal Requirements.

6.2.1. Passport. Carry a valid passport on all missions outside the CONUS.

EXCEPTION: Unit commanders may authorize newly assigned personnel who have applied for, but not yet received, a passport to act as crewmembers on missions not scheduled to transit locations where passports are required.

6.2.2. Shot Record. Ensure immunization requirements are met. Carry shot record on all missions outside the CONUS states (except overseas units on local training missions). C-130 crewmembers must maintain worldwide shot requirements.

6.2.3. Corrective Lenses. Comply with AFI 11-202V3.

6.2.4. Driver's License. A valid state driver's license is required on each TDY where use of US government general purpose vehicles may be required.

6.2.5. Identification Tags. Two required for all flights.

6.2.6. FOD Hazards. Crewmembers will not wear wigs, hair pieces, rings, ornaments, pins, clips, other hair fasteners, or earrings in the aircraft or on the flight line.

EXCEPTION: Crewmembers may wear plain elastic hair fasteners and/or barrettes providing they do not interfere with the wearing of headsets, or the donning of oxygen equipment; they will be accounted for before and after flight.

6.2.7. Helmets and Oxygen Masks. Carry a personal helmet and oxygen mask anytime parachutes are pre-positioned aboard the aircraft (to avoid head injuries during bailout), or when operational requirements exist. Normally, loadmasters, aircrew members deploying overseas, aircrew members participating in contingency operations, high altitude low opening (HALO) aircrews, and aircrews participation in combat aircrew training (CAT) sorties or FLAG exercises will carry personal helmets and oxygen masks. If parachutes are not pre-positioned aboard the aircraft, and sweep-on oxygen masks are installed, flight deck aircrew members are not required to carry personal helmets and oxygen masks unless an operational requirement exists. Refer to AFI 11-302 for aircraft configuration requirements.

6.2.7.1. IAW AFI 11-302 crewmembers will present their personal oxygen equipment to the unit life support facility for inspection within 30 days before each flight requiring personal helmets and oxygen masks. As a minimum, helmets and oxygen masks will be inspected every 120 days.

6.2.8. Tool and Airdrop Kits. At least one engineer's tool kit and one loadmaster's tool kit will be on board for all missions. One loadmaster airdrop kit will also be aboard the aircraft for aerial delivery missions. Units will identify tool kit contents and inventory procedures in their **Chapter 10**. As a minimum, the flight engineer tool kit will contain the tools necessary to perform the emergency actions in section 3 of the flight manual and the hostile environment repair procedures listed in **Chapter 12**. One night vision goggle (NVG) aircraft preparation kit will be onboard for NVG missions (if required).

6.2.9. Flashlights. Each crew member must carry an operable flashlight for night flights as defined in AFI 11-202V3.

6.2.10. A reflective belt or suitable substitute will be worn on unlit flight lines during hours of darkness or periods of reduced visibility (IAW AFOSH Standard 127-100, *Aircraft Flight Line - Ground Operations and Activities*).

6.3. Pre-mission Actions.

6.3.1. Accomplish Theater Indoctrination Training prior to transiting Asia, Pacific, Australia and Indian Ocean; Africa and the Middle East; Europe, Baltic's, and Russia; and Caribbean, Central America, and South America.

6.3.1.1. Contents of the theater indoctrination folders should be tailored to each unit's specific mission. As a minimum, the following will be included:

6.3.1.1.1. Mission/Deployment Checklist. A locally developed checklist that includes mobility, training, and personnel requirements that should be accomplished prior to departure, and personal/professional items the aircrew must take with them.

6.3.1.1.2. Airspace/Airfield Review. Flip, fir/uir/adiz procedures.

6.3.1.1.3. Airspace classifications, ASRR, and airport qualification videos (if available).

6.3.1.1.4. Theater Instrument Procedures. Required instruments and/or procedures for Non-DoD Approaches, course reversal approaches, circling, holding, NDB approaches, Host Nation/Jeppesen Approaches, and Altimeter setting procedures.

6.3.1.1.5. Organized Track Systems. MNPS Airspace requirements; North Atlantic and Pacific Region Track Systems.

6.3.1.1.6. Communication and Emergency Procedures. C2, over-water position reporting, lost communications procedures, emergency procedures, and weather information sources.

6.3.1.1.7. Border Clearance. FCG, customs, immigration, agriculture, insect and pest control, and diplomatic clearances.

6.3.1.1.8. Flight planning. DD Form 1801, **DoD International Flight Plan,** computer flight plan, approach plates and charts, theater weather conditions, fuel reserves and alternate requirements, equal time points/critical wind factors, and international NOTAMs.

6.3.1.1.9. Special Military Operations. Altitude reservations, due regard, and formation limitations.

6.3.1.1.10. Other Regulatory Requirements. General navigation procedures, life support equipment, hazardous cargo, crew rest/crew duty time, aircraft records/781 procedures, mission essential ground personnel/additional crewmembers, passenger handling, etc.

6.3.1.1.11. Location Information. C2/reporting procedures, maintenance problems, aircraft security, social customs and taboos, billeting, transportation, etc.

6.3.1.2. Units may consolidate information common to all geographic areas into one folder titled "general deployment information." The remainder of the folders would contain only theater specific information.

6.3.1.3. Aircrews will review theater indoctrination folders prior to mission/deployment.

6.3.1.4. Upon return, the AC will compile a trip report, when necessary, detailing lessons learned. The trip report will be placed in the theater indoctrination folder, closing the loop on ensuring validity of the folder.

6.3.2. Review tasking, itinerary, and altitude reservation (ALTRV) requirements.

6.3.3. Review applicable OPORD and FLIP.

6.3.4. Review the FCG for areas of operation (to include classified portion). Obtain necessary diplomatic clearances where required.

6.3.5. Obtain required customs forms.

6.3.6. Coordinate with combat crew communications for worldwide FLIPs and sufficient communications security (COMSEC) materials for the duration of the mission.

6.3.7. Ensure physiological training, annual physical, immunizations, and flight evaluations will remain current throughout the TDY period.

6.3.8. Ensure visas have been received, if required.

6.3.9. Obtain terrain charts for all destinations. If unavailable the OG/CC must be notified.

6.3.10. Compile sufficient spare forms, flight orders, etc. to cover the TDY period.

6.3.11. Release available seats to passenger terminal. Coordinate with ATOC to release available seats to the passenger terminal (*USAFE only*).

6.3.12. Area Navigation (RNAV) Routings. The C-130 with SCNS or other approved equipment is approved for area navigation throughout the National Airspace System where radar monitoring by ATC is available. ATC will radar monitor each flight, however, navigation on the random RNAV route is the responsibility of the aircrew. When filing RNAV routings, use transponder code “R” on the DD Form 175, **Military Flight Plan**, DD Form 1801, **DoD International Flight Plan**. Two methods are available for filing RNAV routes: one, based on navigational aids and the other, based on latitude and longitude coordinates. Comply with FLIP General Planning (GP) when filing for an RNAV route.

6.4. Aircrew Publications Requirements. Primary crewmembers will carry the publications specified in **Table 6.1.** on all missions. Units may specify additional publications in their local **Chapter 10**. Only one set of publications (except checklists) is required per crew position when more than one crewmembers is on board the aircraft (i.e., two loadmasters on airdrop missions).

Table 6.1. Aircrew Publications.

PUBLICATION	AIRCREW
Aircraft Flight Manual (-1)	E
Aircraft Performance Manual (-1-1)	E
Aircraft Flight Manual (SCNS -1-4)	CP
Abbreviated Checklists	All crewmembers will carry the abbreviated checklist(s) for their crew position.
TO 1C-130-101	E
TO 1C-130A-9	L
AFI 11-202V3	CP
AFI 11-2C-130V3	CP, E and L
Appropriate Fuel Planning Document	N
AFI 13-217	N (or copilot, if navigator not on board aircraft)
AFI 11-231 (Airdrop-qualified only)	N
TO 1C-130E-1-2 (AWADS)	N
AFI11-299 (PNAF only)	P
TO 1C-130E-16-1 (PNAF only)	L
TO 1C-130E-16-2 (PNAF only)	L
TO 1C-130E-16-1CL-1 (PNAF only)	P

6.5. Airfield Certification. All crewmembers and staff mission planners will review airport qualification audiovisual slide tape or video programs, as available, before operating missions into unfamiliar airfields. In addition, aircrews will consult and comply with the ASRR and should contact HQ AMC/DOVS for updates to airfield operability and weight bearing capability. The latest information is available through the world wide web or GDSS/C2IPS.

6.6. Aircrew Intelligence Briefing. Before leaving home station on missions departing the United States, crews will receive an intelligence briefing that will emphasize terrorist, enemy, and friendly political and military development in the area in which they will be flying. In theater, aircrews should receive intelligence updates on initial arrival at a forward operating location (FOL), or enroute stop, and thereafter when significant developments occur. Report information of possible intelligence value to the local intelligence officers at the completion of each mission.

Section 6B—Predeparture

6.7. Flight Crew Information File (FCIF).

6.7.1. Review FCIF, volume 1, (index and safety-of-flight files, as a minimum) before all missions or ground aircrew duties. Update the FCIF currency record with the latest FCIF item number, date, and crew member's initials or as specified.

6.7.2. Crewmembers delinquent in FCIF review or joining a mission enroute will receive an FCIF update from a primary aircrew member counterpart on the mission. Instructors who fly with general officers are responsible for briefing appropriate FCIF items.

6.7.3. Crewmembers not assigned or attached to the unit operating a mission will certify FCIF review by entering the last FCIF number and their initials behind their name on the file copy of the flight authorization or file copy of their crew orders (or as specified in MAJCOM supplement to this AFI).

6.8. Flight Crew Bulletins.

6.8.1. FCBs are issued under provisions of AFI 11-202V2, *Aircrew Standardization/ Evaluation Program*, and the appropriate MAJCOM supplement. OG Stan/Eval is the office of primary responsibility (OPR) for FCBs. Items in the FCB may include local procedures and policies concerning equipment and personnel generally not found in any other publications.

6.8.2. All crewmembers should be cognizant of FCB contents.

6.9. Airfield Security. When departing on missions destined outside the CONUS, ACs should review applicable MAJCOM security publications.

6.10. Mission Kits. Carry mission kits on all operational missions. Suggested items include:

NOTE: * Indicates mandatory for all missions away from home station.

6.10.1. Publications:

6.10.1.1. *AFI 11-401, *Flight Management*

6.10.1.2. *AFI 23-202, *Buying Petroleum Products and Other Supplies and Services Off-Station*

6.10.1.3. *AFJI 11-204, *Operating Procedures for Aircraft Carrying Hazardous Materials*

6.10.1.4. *Airfield Suitability and Restrictions Report (ASRR)

6.10.1.5. *AMC Aircrew Border Clearance Guide

6.10.1.6. *FCB (if applicable)

6.10.2. Forms:

6.10.2.1. DD Form 1351-2, **Travel Voucher or Sub voucher**

6.10.2.2. DD Form 1351-2c, **Travel Voucher or Sub voucher (Continuation Sheet)**

6.10.2.3. *DD Form 1854, **US Customs Accompanied Baggage Declaration**

6.10.2.4. DD Form 1748-2, **Airdrop Malfunction Report (Personnel-Cargo)**

6.10.2.5. *DD Form 2131, **Cargo/Passenger Manifest**

6.10.2.6. *CF 7507, **General Declaration Outward/Inward**

6.10.2.7. *AF Form 15, **United States Air Force Invoice**

6.10.2.8. *AF Form 315, **United States Air Force AvFuels Invoice**

6.10.2.9. AF Form 457, **USAF Hazard Report**

6.10.2.10. *AF Form 651, **Hazardous Air Traffic Report (HATR)**

6.10.2.11. *AF Form 1297, **Temporary Issue Receipt**

6.10.2.12. AF Form 3211, **Customer Comments**

6.10.2.13. *AF Form 4108, **C-130 Fuel Log**

6.10.2.14. *AFTO Form 151A, **Individual C-130 Aircraft Usage Log**

6.10.2.15. AMC Form 38, **Air Mail CRM Anonymous Reporting System**

6.10.2.16. AMC Form 43, **AMC Transient Aircrew Comments**

6.10.2.17. AMC Form 54, **Aircraft Commander's Report on Services/Facilities**

6.10.2.18. *AF Form 4091, **Mission Data**

6.10.2.19. AF Form 711, **USAF Mishap Report**

6.10.2.20. *AF Form 4031, **Crew Resource Management (CRM) Assessment Sheet**

6.10.2.21. *AF Form 4075, **Aircraft Load Data Worksheet**

6.10.2.22. AF Form 4064, **C-130 Takeoff and Landing Data Card**

6.10.2.23. HMS Customs Declaration

6.10.2.24. Japanese Customs Declaration

6.10.3. Orders:

6.10.3.1. DD Form 1610, **Request and Authorization for TDY Travel of DoD Personnel**

6.10.3.2. AF Form 1631, **NATO Travel Orders** (when required)

6.10.3.3. *AMC Form 41, **Flight Authorization** (or MAJCOM prescribed according to AFI 11-401, *Flight Management)*.

6.10.4. Miscellaneous:

6.10.4.1. *Box car seals.

6.10.4.2. *Masking tape.

6.11. Route Navigation Kits.

6.11.1. A route navigation kit is issued at home station and remains with the aircraft until return. Kits contain sufficient quantities of material to cover the planned mission and global operations as required.

6.11.2. Minimum contents of route navigation kits are in **Table 6.2.**.

6.11.3. Local area navigation kits may be used in lieu of route navigation kits in **Table 6.2.**. on local unit training sorties. Contents of these kits will be determined by the unit.

Table 6.2. Route Navigation Kit Contents

Item (applicable to area of operation):	Number
FLIP GP Planning (sections GP, AP/1, AP/1B, AP/2, AP/3)	1
FLIP IFR Supplement	2
FLIP Flight Information Handbook	2
FLIP Enroute (high and low)	2
FLIP Instrument Approach Procedures (high and low)	*3
Standard Instrument Departures (East and West United States, volumes 1 and 2)	*3
Instrument Departures Europe and North Africa (high and low)	*3
Standard Terminal Arrival Routes (STAR)	*3
Topographical and Sectional Charts for areas of operation (GNC/OPC/TPC/JNC/JOG/Sectionals)	as required
FLIP VFR Supplement	1
DoD Area Arrival Charts	(2) if available
Note: *Two required when a navigator is not part of the crew.	

6.12. Briefing Requirements.

6.12.1. AC's Crew Briefing. Cover all applicable items of the operations briefing, including MAJCOM, NAF, and unit special interest items (SIIs).

6.12.2. Specialist Briefings. Use specialist briefings to detail operating procedures or special interest items peculiar to various crew positions, and to answer questions relating to those specialties.

6.12.3. Weather Briefings. Request a written weather briefing on DD Form 175-1, **Flight Weather Briefing**. Verbal weather briefings are authorized for local flights. Obtain a briefing on current weather, trends, and forecast for the proposed route, destination, and alternates. The AC will obtain the weather briefing. Ensure all primary crew are briefed on appropriate weather conditions before departure. If the flight will transit non-Air Force bases, crews must make arrangements to ensure adequate weather support facilities and services are available. If adequate services are not available, crews will obtain weather support through any means available to ensure required weather data is in their possession prior to mission accomplishment. When face-to-face briefings are not possible, obtain a telephone weather briefing (precedence up to and including IMMEDIATE is authorized). The designated MAJCOM regional briefing stations provide the telephone briefing for CONUS flights.

6.12.3.1. Obtain weather information from US Military weather services, any FAA-approved weather source, or any host nation civil or military weather source.

6.12.4. Buffer Zone. Prior to operating an aircraft within or adjacent to an established buffer zone, the pilot will ensure primary crewmembers are briefed on current buffer zone procedures outlined in appropriate directives.

6.12.5. Peacetime and Wartime SAFE PASSAGE Procedures. Pilots must be familiar with peacetime and wartime safe passage of friendly military aircraft (if applicable).

6.12.6. Unit Operations and Mission Commander Briefing. At locations where no MAJCOM C2 exists, the unit operations officer, mission commander, or a designated representative will brief crewmembers prior to each mission.

6.12.7. Pre-Deployment Briefing. Before deployments, the operations officer, mission commander, or designated representative will assemble the crew and brief description and purpose of the mission, tentative itinerary, aircraft configuration, special equipment, fuel load, clothing required, anticipated housing and messing facilities, sufficient money to defray individual's anticipated expenses, personal equipment and field equipment requirements, special clearance requirements, and flying safety.

6.13. Call Signs.

6.13.1. Training Missions. Aircraft will use the unit static call sign prefix followed by a 2-digit suffix assigned by the parent unit.

6.13.2. Operational Missions. Aircraft will use call signs assigned by OPORD, FRAG, or diplomatic clearance. If no call sign has been assigned to the mission, use unit static call signs. When flying AMC channel missions, aircraft will use the "REACH" call sign followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number (or as required by diplomatic clearance). Complete flight plans as follows:

6.13.2.1. On the DD Form 1801, item 7, put the letters "RCH" followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number.

6.13.2.2. On the Form 1801, item 18, remarks section, put "RMK / RCH designates Reach call sign."

6.13.2.3. On the DD Form 175, aircraft call sign block, put "RCH" followed by the last digit of the year the aircraft was built and the last three digits of the aircraft tail number.

6.13.2.4. On the DD Form 175, remarks block, put "RCH designates Reach call sign".

6.13.3. The Reach 01, 15, and 21 call signs will only be used by the AMC/CC, 15 AF/CC, and the 21 AF/CC. respectively.

6.13.4. Aeromedical Evacuation (AE). For actual aeromedical evacuation missions, use the call sign "Air Evac" followed by the five digit aircraft number (example, Air Evac 12345) or mission designator (as required by FLIP). When the AE portion of the mission is completed, normal call signs will then be used.

6.13.5. Search and Rescue. On actual search, rescue, and recovery missions, use the call sign "Air Force Rescue" plus the last five digits of the aircraft tail number.

6.14. Instrument Flight Rules. Conduct flight operations under IFR to the maximum extent possible without unacceptable mission degradation. This does not preclude VFR training to maintain proficiency in mission essential VFR operations.

6.15. Flight Data Verification.

6.15.1. Computer Flight Plan (CFP) Use. Contracted CFPs or CFPs available from DET 1, AMC CPSS are the official sources of performance, navigation, and climatic data, including enroute wind information. If stand-alone computer based plans are used, each mission segment should utilize best wind data available. Use only validated CFP for flights involving C-130 aircraft. See AMCI 11-208, *Tanker/Airlift Operations*, Chapter 8 for addition information.

6.15.1.1. Flight crews may manually compute flight plans, use mainframe based or contracted CFPs, or utilize CFPs provided by the staff. CFPs should be utilized to the maximum extent practical. The flight crew has final responsibility for accuracy of the flight plan used.

6.15.1.2. CFPs will be verified by the flight crew for route of flight and fuel computation accuracy prior to departure. Pass any flight plan discrepancies to the TACC Flight Planning Office. Identify inaccurate CFP winds by special report if the average wind for a route segment exceeds either 30 degrees error in direction or 25 knots in speed. When reporting incorrect flight plans include both the CFPI and the plan number.

6.15.2. The flight engineer will complete AF Form 4064, **C-130 Takeoff and Landing Data Card** and AF Form 4063, **Mini C-130 TOLD Card,** as specified in **Chapter 12**. Pilots and copilots will use AF Form 4063, **Mini C-130 TOLD Card**. A pilot crewmember, or additional flight engineer, will cross-check the AF Form 4063, **Mini C-130 TOLD Card** for accuracy by using the performance manual or approved tabulated data. As a minimum, the person checking the data will:

6.15.2.1. Verify gross weight independently from the AF Form 4063, **Mini C-130 TOLD Card**.

6.15.2.2. Cross-check air minimum control Vmca (one engine inop in ground effect), takeoff, and landing speeds.

6.15.2.3. Review and compare the computed distances or ground roll with the actual conditions and runway available.

6.16. Departure Planning: Use AFI 11-202V3, AFMAN 11-217, this chapter and the appropriate MAJCOM supplement.

6.16.1. Gross Weight (GW). Ensure that the aircraft does not exceed the maximum GW, zero fuel weight, or center of gravity limitations specified in the aircraft flight manual. GW may be further restricted by operating conditions such as, icing, temperature, pressure altitude, runway length and slope, aerodrome weight bearing capacity, departure maneuvering, required climb gradients, and obstacles.

6.16.1.1. Takeoff GW must not exceed that which would, in the event of an engine failure, lower the rate of climb to less than a 2.5 percent climb gradient.

6.16.1.2. Critical Field Length (CFL). Takeoff GW must never exceed that which would require CFL in excess of the runway available for a normal takeoff. In some cases, a minimum altitude is required at the Departure End of Runway (DER). This is also known as a screen height. The runway available must exceed CFL by at least 50-feet for every 1 foot of altitude required at DER. Use the following as a guide to determine DER requirements. Required screen heights depend on the agency that wrote the standard instrument departure (SID) (identification in parentheses immediately to the right of the SID chart reference number).

6.16.1.2.1. SIDs. Required DER heights depend on the agency that wrote the SID.

6.16.1.2.1.1. USAF, US Navy (USN), or US Marine Corps (USMC) SID: Zero (0)-feet.

6.16.1.2.1.2. US Army and FAA SID: 35-feet.

6.16.1.2.1.3. Foreign Civil or Military SID (must be an ICAO member nation listed in FLIP GP): 16-feet.

6.16.1.2.2. Radar Vector, Published IFR Departure Procedure or VFR Departures.

6.16.1.2.2.1. USAF, USN, or USMC Airfield: Zero (0)-feet.

6.16.1.2.2.2. US Army or FAA Civil Airfield: 35-feet.

6.16.1.2.2.3. Joint Use Airfield within the United States: 35-feet.

6.16.1.2.2.4. Foreign Civil or Military Airfield (must be an ICAO member nation listed in FLIP GP): 16-feet.

NOTE: DER requirements for departures other than those listed above vary. There is no standard or easy way for crews to determine required DER height (or screen height) at some airfields. Therefore, when using departures other than those listed above, plan to cross the DER at 35-feet (minimum) unless you can ascertain a different requirement from the appropriate authority.

NOTE: If aircraft performance will not allow crossing the departure end of runway at required DER, the proposed route of flight must be examined using a current aeronautical and terrain charts to ensure aircraft performance is sufficient to clear ALL obstacles. The crew must advise the ATC agency involved that they cannot meet the SID requirement.

6.16.2. IFR Departure Routing/Climbout Performance (also see paragraph **6.17.5.** through **6.17.8.**). Appropriate terrain charts should be reviewed prior to departure. Regardless of the type of departure flown (SID, Specific ATC Departure Instructions, IFR Departure Procedure, or Diverse Departure), the aircraft must be able to achieve the published climb gradient (for the runway to be used) with all engines operating, and be able to vertically clear all obstacles within the climbout flight path with one engine inoperative (***EXCEPTION:*** see paragraph **6.17.6.**). If no minimum climb gradient is published and you are able to compute all engine operating data, use 200-feet/NM minimum with all engines operating and 152 feet/NM minimum with one engine inoperative. If a higher required climb gradient is published or required for radar vectors, use that climb gradient as the minimum with all engines operating, and use that climb gradient minus 48-feet/NM as the minimum with one engine inoperative. This only works at fields having an instrument approach. If the field does not have an instrument approach, then no obstacle survey has been conducted. Therefore, you don't know if 200/152 feet/NM is sufficient. ***NOTE:*** At airfields with no instrument approach, an IFR departure is NOT AUTHORIZED.

NOTE: SIDs will not depict obstacles if a 2.5 percent climb gradient is sufficient to clear them (see **Figure 6.1.**).

6.16.2.1. SIDs. OPRs for SIDs are identified on each individual SID. They are either FAA, United States Army (USA), USN, USMC, or USAF. On non-DoD SIDs, the agency that wrote the SID will also be identified (in parentheses immediately to the right of the Chart Reference Number). For example:

6.16.2.1.1. SL-000.00 (USA) would indicate a DoD SID where the US Army is both the OPR and the agency that wrote the SID.

6.16.2.1.2. (USAF) SL-000.00 (RAF) would indicate a non-DoD SID where the USAF is the military department that requested publication and serves as the OPR, but the Royal Air Force is the agency that wrote the SID. Use the agency that wrote the SID to determine the required screen height.

6.16.2.2. Published IFR Departure Procedures. Published IFR departure procedures are available at some civil and military fields to assist in avoiding obstacles during climb to the Minimum Enroute Altitude (MEA). Airfields with published IFR departure Procedures will have the inverted triangle with a white "T" symbol printed on the approach plates and SIDs. When using Jeppesen publications, IFR departure procedures will be on the airfield diagram page which are typically on the reverse side of the airport's first approach. A climb gradient and/or specific routing and/or alternate takeoff weather minimums will normally be specified with a published IFR departure procedure. When flying a published IFR departure procedure, depicted routing and climb gradients must be flown to avoid obstacles. The alternate takeoff weather minimums allow aircraft to depart with minimum ceiling and visibility. USAF aircrews are not authorized to use these alternate takeoff weather minimums.

NOTE: If the published IFR departure procedure does not include either a routing or a minimum climb gradient (i.e., it includes only alternate takeoff weather minimums) then an IFR departure from that airfield IS NOT AUTHORIZED unless you fly a SID or depart via radar vectors.

6.16.2.3. Specific ATC Departure Instructions (Specific climbout instructions or "radar vectors"). Crews may depart via specific ATC departure instructions, however, the SID prescribes a safe route of flight for a climb to the enroute structure, while minimizing radio communication. Even if you plan to depart via specific ATC departure instructions, the crew should still have the SID on board (if published).

6.16.2.4. If the airport does not have an authorized IFR departure method, the weather at takeoff must permit a VFR climb to an IFR MEA, an appropriate IFR cruising altitude, or an altitude where radar vectors can be provided.

6.16.3. VFR Departures (VFR Flight Plan).

NOTE: VFR departures will not be flown in lieu of obstacle clearance planning.

6.16.3.1. VFR departures require detailed planning to ensure obstacles and high terrain are avoided. Conduct VFR operations only when required for mission accomplishment.

6.16.3.2. The minimum climb gradient for VFR departures is determined by ensuring the following conditions are met:

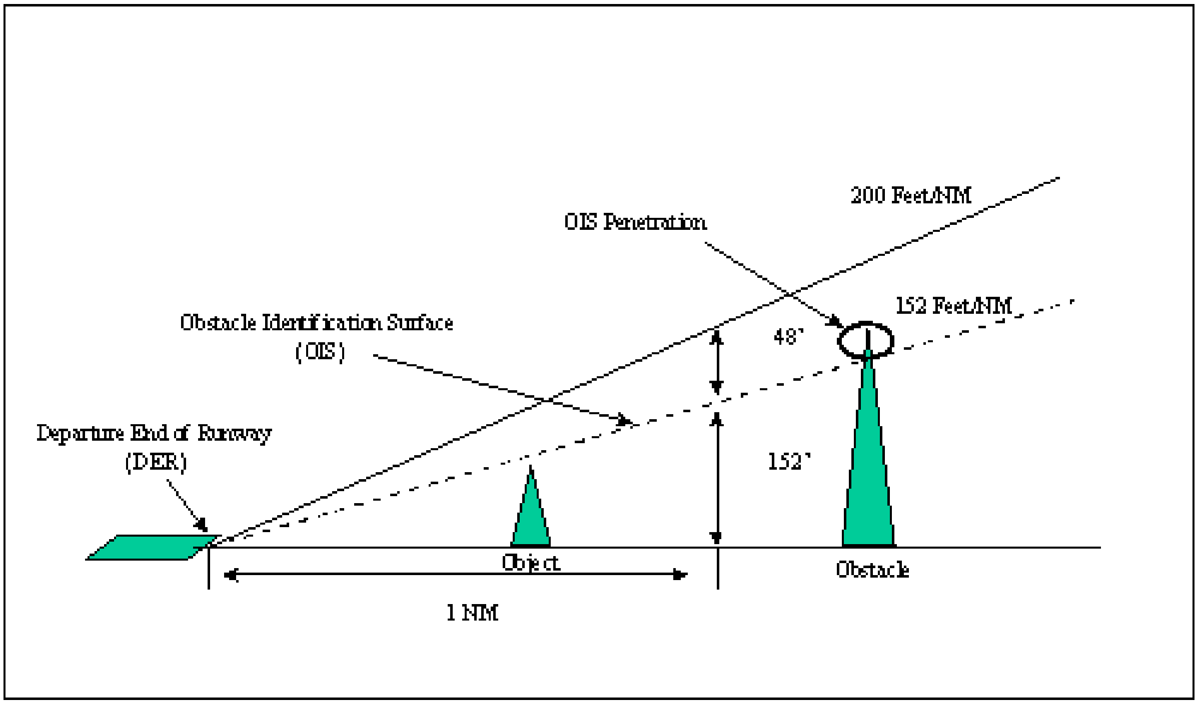
6.16.3.2.1. Four-engine climb gradient capability ensures obstacle avoidance along the planned departure route.

6.16.3.2.2. Engine-out climb gradient capability ensures that in event of an engine failure, the planned departure or emergency return route provides obstacle avoidance. Even when obstacles are not a factor, the aircraft must be capable of climbing at a rate of at least 200-feet per minute on three engines at obstacle clearance speed.

6.17. Obstacle Clearance Planning: Use AFI 11-202V3, AFMAN 11-217, this chapter and the appropriate MAJCOM supplement.

6.17.1. Obstacle Identification Surface (OIS). Obstacle identification for SID purposes (FAA Handbook 8260.3B, AFJMAN 11-226, UV Standard for Terminal Instrument Procedures (TERPS), are those objects that penetrate an OIS of 40:1 (152-feet per NM). Calculation of the OIS on a SID continues until the SID reaches a MEA or until the SID terminates. Climb gradients of 200-feet per NM will provide at least 48-feet per NM clearance above all obstacles that do not penetrate the OIS. Complying with published climb gradients found on a SID or IFR departure procedure will provide at least 48-feet per NM clearance above all obstacles that do penetrate the OIS. The AC must be aware and thoroughly brief the crew on all obstacles along the departure flight path.

Figure 6.1. Obstacle Identification Surface.



6.17.1.1. The AMC ASRR is an excellent source for obstacle information, however, it is not a stand-alone document. It is intended to supplement published climb gradients and obstacle information found on SIDs, published IFR departure procedures, GDSS/C2IPS, and terrain charts.

6.17.1.2. Aircrews may call HQ AMC/DOVS for additional airfield obstacle data at DSN 576-4508.

6.17.2. Objects penetrating the OIS may or may not be depicted (they definitely will not be depicted on civil procedures). Objects that do not penetrate the OIS will normally not be depicted.

6.17.3. SIDs simplify ATC procedures while providing safe routing to the en-route structure; however, SIDs should not be used as the sole source of obstacle information for departure planning. If used as such, inadequate (engine out) obstacle clearance may result. SIDs, instrument approach plates, and topical sectional charts, must be used to determine the distance and height values for all significant obstacles along the flight path.

6.17.4. The controlling obstacle is defined as the obstacle requiring the greatest climb gradient within the flight path. Obstacles are normally not depicted on SIDs when climb gradients of less than 152-feet per NM are required to clear them.

6.17.5. In order to fly any IFR departure, aircrews must ensure they can meet the published/required climb gradient for the planned departure with all engines operating. In addition, aircrews will accomplish the following to ensure they can vertically clear all obstacles on or reasonably near the climbout/emergency return flight path with one engine inoperative.

6.17.5.1. Use the most restrictive of the following to determine whether engine out climb performance is sufficient to provide obstacle clearance.

6.17.5.1.1. Using applicable obstacle height and distance information from available terrain charts (JOG, TPC, sectional, etc.), the ASRR, base operations, etc., ensure engine out climb performance is sufficient to vertically clear obstacles which are on, or reasonably close, to the planned departure and emergency return flight path.

6.17.5.1.2. If a climb rate is published for the planned departure, obtain an "engine out" climb rate by subtracting 48-feet from the published climb rate (if the climb rate is published in feet per minute, use the "60 kts" column, this is the same as feet per nautical mile). Compare this figure with actual airplane climb capability using the appropriate "3-Engine Climbout Flight Path" chart. If actual capability is less than required "engine out" climb rate, comply with paragraph **6.17.5.2.**.

6.17.5.2. In the event that the "engine-out" climb rate is not sufficient to clear all obstacles, the crew will consider the following.

6.17.5.2.1. Downloading cargo.

6.17.5.2.2. Downloading fuel.

6.17.5.2.3. Delaying the mission until climatological conditions allow for sufficient performance to clear all obstacles.

6.17.5.2.4. Coordinating alternate departure procedures with the controlling agency that will provide obstacle clearance.

6.17.6. If none of the options in paragraph **6.17.5.2.**. are feasible, the crew may depart, at the discretion of the AC, on an IFR departure only if all the following conditions are met:

6.17.6.1. Mission requirements dictate.

6.17.6.2. The aircraft is capable of achieving the minimum published/required climb gradient (200 feet/NM if none published/required) with all-engines operating.

6.17.6.3. Day/VFR conditions exist on the entire departure and planned emergency return routing.

6.17.6.4. The AC has determined through a review of all applicable maps and charts that, in the event of an engine failure, the planned departure and emergency return routing will allow for obstacle avoidance.

6.17.6.5. The planned emergency route is briefed to the entire crew.

NOTE: ANG aircrews require home unit OG/CC approval before exercising this option.

6.17.7. In the event of an engine failure, aircrews will advise ATC if they are unable to comply with the published minimum climb. Obtain radar vector or avoid all obstacles visually.

6.17.8. The following procedures apply for all departures.

6.17.8.1. The pilot will provide the obstacle height, distance, and gradient information necessary for performance computations to the flight engineer. As a minimum, review the appropriate terrain chart or sectional chart in addition to the SID (if available). The following guidelines should help eliminate obstacles that are not a factor.

6.17.8.2. All obstacles on the SID will be considered. If no distance is published, use appropriate aeronautical chart (if available) to estimate flying distance to depicted obstacles.

6.17.8.3. When utilizing other sources for obstacle information, consider all obstacles which fall within the departure, or emergency return routing.

6.17.8.4. Escape routing must always be planned to ensure obstacle clearance and emergency recovery during engine failure.

6.18. Alternate Planning.

6.18.1. Choose alternates that best meet mission requirements and conserve fuel. Those selected should not be within the same terminal area, if terminal forecasts are marginal. Select alternates that are not restricted by FLIP, FCG, or diplomatic clearances, and are compatible with the mission load and performance characteristics of the aircraft.

6.18.2. The AC retains final authority in the choice of alternates; however, selection by support agencies normally should be used if they meet the above criteria and the aircraft has already been serviced.

6.18.3. Alternates selected must meet the alternate airport weather requirements according to AFI 11-202V3 and **Table 6.3.**.

Table 6.3. Weather Minimums for Takeoff.

Mission	Visibility	Remarks
Operational	RVR 1000	When less than RVR 1600, but equal to or greater than RVR 1000, the crew may takeoff provided the runway has dual RVR readouts and displays (minimum RVR 1000 on both) and runway centerline lighting is operational. For any takeoff below 1600 RVR, the crew must be fully qualified.
All others	RVR 1600	For runways with more than one operating RVR readout, RVR must read 1600 minimum on all.

NOTE: When weather is below approach and landing minimums (ceiling or visibility) a takeoff alternate is required (See paragraph **6.19.**).

NOTE: If no RVR readout is available for the departure runway, visibility must be reported to be 1/2 mile (800 meters).

6.19. Departure Alternates.

6.19.1. A departure alternate is required if ceiling or visibility is below landing minimums for an available approach (at departure aerodrome). If planning an ILS approach, Category I minimums will be used.

6.19.2. Suitability of Departure Alternates. When departure alternate is required, the aircraft must be capable of maintaining the MEA or minimum obstruction clearance altitude (MOCA), whichever is higher, to the alternate using one engine-out performance criteria. To qualify as a departure alternate, the airfield must meet one of the following conditions.

6.19.2.1. Existing weather at an alternate within 30-minutes flying time must be equal to, or better than the published approach minimums, and forecast to remain so until 1 hour after takeoff, but in no case forecast to be lower than 200-1/2 (RVR 2400), or;

6.19.2.2. The existing weather at an alternate within 2-hours flying time must be at least 500-1 above the lowest compatible published approach minimums, but not less than 600-2 for a precision approach or 800-2 for a non-precision approach, and forecast to remain so for 1-hour after ETA at the alternate.

6.20. Destination Requirements (for filing purposes). The forecast destination weather requirements will be according to AFI 11-202V3 and the following:

6.20.1. File two alternates when:

6.20.1.1. The forecast weather is less than required minimums for the lowest compatible approach.

6.20.1.2. The forecast surface winds (intermittent or prevailing) exceed limits corrected for RCR.

6.20.2. File an alternate, regardless of forecast weather, when the departure or destination aerodrome is outside the CONUS. (**EXCEPTION**: Intratheater flights outside CONUS that do not exceed 3-hours, comply with basic AFI 11-202V3.) If the destination is remote or an island, with no alternate available, add holding fuel in lieu of an alternate in accordance with **Table 14.1.**

6.20.3. A remote or island destination is defined as any aerodrome which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2-hours flying time. The forecast weather at the remote or island destination must meet the following criteria:

6.20.3.1. The prevailing surface winds, corrected for RCR, must be within limits at ETA and forecast to remain so for 2-hours thereafter, and

6.20.3.2. The prevailing ceiling and visibility must be equal to or greater than published minimums for an available non-precision approach, for ETA plus 2-hours.

NOTE: If a precision approach is available, the ceiling or visibility may be intermittently below non-precision approach minimums (excluding ASR), but not below precision approach minimums (for ETA plus 2-hours).

6.21. Adverse Weather.

6.21.1. Plan and fly all missions to avoid areas of known or forecast severe weather including severe icing or severe turbulence, which may exceed aircraft limitations.

6.21.2. During flight, use any means available to avoid thunderstorms by at least:

6.21.2.1. 20NMs at or above flight level (FL)230.

6.21.2.2. 10NMs below FL230.

6.21.2.3. 5NMs for tactical low-level operations below FL230 provided the outside air temperature is at or above 0 degrees Celsius at flight altitude. Avoid gust fronts and winds preceding a rapidly moving thunderstorm.

6.21.3. The use of ground-based radar as a means of thunderstorm avoidance should only be used to assist in departing an inadvertently penetrated area of significant weather. It should never be considered a normal avoidance procedure. When relying exclusively on ground-based radar for weather avoidance, and the ground controller is unable to provide avoidance instructions, attempt to maintain VMC by:

6.21.3.1. Changing routing.

6.21.3.2. Diverting to alternate.

6.21.3.3. Declaring an emergency and requesting priority assistance.

6.21.4. Aircrews should avoid flying in areas of recently dissipated thunderstorms and advected clouds downwind of thunderstorms. Crew actions should err on the side of safety.

6.21.5. Do not fly directly above (within 2,000 feet) thunderstorms or cumulonimbus clouds. If unable to vertically clear thunderstorms or cumulonimbus clouds by at least 2,000 feet vertically, you must avoid them using the above criteria.

CAUTION: Aircraft damage may occur 20NMs or more from any thunderstorms. Aircrews must familiarize themselves with information on thunderstorm development and hazards. Refer to AFI 11-203, *Weather for Aircrews*.

6.21.6. In order to minimize exposure to thunderstorm hazards when approaching or departing an airport in an area where thunderstorms are occurring or are forecast:

6.21.6.1. Attempt to maintain VMC.

6.21.6.2. Maintain at least 5NMs separation from heavy rain showers

6.21.6.3. Avoid areas of high lightning potential, i.e., clouds within plus or minus 5,000 feet of the freezing level.

NOTE: Approaches or departures may be accomplished when thunderstorms are within 10NMs. The thunderstorms must not be producing any hazardous conditions (such as hail, lightning, strong winds, gusts fronts, heavy rain, wind shear, or microburst) at the airport, and must not be forecast or observed to be moving in the direction of the route of flight (to include the planned missed approach corridor, if applicable).

6.21.7. Aircrews performing approaches and landings at locations where temperatures are 0 degrees Celsius or below will refer to the FIH, section D, Temperature Correction Chart, to correct MDA, DH, and other altitudes inside the FAF if required.

6.21.8. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. Crews should use good judgment when flying into any area conducive to mountain wave turbulence, and avoid these areas of potential turbulence when possible.

6.21.8.1. Mountain wave turbulence is normally a predictable condition. Forecasters at base weather stations, using guidance products from weather centers, can advise crews of the potential for encountering mountain wave turbulence along planned routes of flight. However, weather data availability in mountainous regions and forecast model limitations prevent the prediction of all events. Crews must be familiar with the causes of mountain wave turbulence and the characteristic clouds that generally forewarn its presence.

6.21.9. Flight into areas of forecast or reported severe icing or severe turbulence is prohibited.

6.21.10. Significant Meteorological Information (SIGMET) advisories will be transmitted from the servicing ATC unit. Crews will consider all SIGMETs valid for their aircraft until verified as not applicable with a military METRO service.

6.21.11. Volcanic Dust Precautions. Plan all missions to avoid general vicinity of volcanic activity. Aircraft operation in area of forecast or known volcanic activity or dust is prohibited.

6.21.12. Lightning Avoidance. The following conditions are most favorable for lightning strikes and prolonged flight in them should be avoided when feasible:

6.21.12.1. Within 5,000 feet of the freezing level.

6.21.12.2. In clouds or in any intensity of precipitation or turbulence associated with thunderstorm activity.

6.22. Not Used.

Section 6C—Preflight

6.23. AFTO Form 781, AFORM Aircrew/Mission Flight Data Document. Review AFTO Form 781 before applying power to the aircraft or operating aircraft systems. The exceptional release must be signed before flight. A maintenance officer, maintenance superintendent, or authorized civilian normally signs the exceptional release. If one of these individuals is not available, the AC may sign the exceptional release. Ensure the Air Force fuel identiplate is aboard the aircraft.

6.24. Aircraft Servicing and Ground Operations.

6.24.1. Aircraft Refueling. Aircrew members qualified in ground refueling may perform refueling duties. Flight engineers acting as refueling supervisors and panel operators will comply with T.O. 00-25-172 and refueling job guide. Aircrews will only refuel in cases when maintenance support is not readily available and the mission would be delayed. Crewmembers may augment maintenance refueling teams at enroute stops.

6.24.2. Concurrent Ground Operations. Concurrent ground operations (simultaneous refueling or de-fueling while cargo or maintenance operations are being performed) are authorized in accordance with T.O. 00-25-172. Aircrews performing Dash-1 preflight inspections or cargo loading concurrent with servicing must have cooperation and close coordination with the Chief Servicing Supervisor (CSS). The CSS will remain in continuous intercom contact with fuel servicing team members during the entire servicing operation. Team members include CSS, refueling panel monitor, fuel specialists, and one person to monitor the opposite side wing fuel vents. Passengers are not allowed on board unless expressly directed by MAJCOM DO/XO, DIRMOBFOR, or in combat. In this case a qualified crewmember is required to monitor the passenger compartment when passengers are on board.

6.24.2.1. Movement into or within the safe area must be under control of the CSS. Individuals must properly ground themselves before boarding the aircraft or handling fuel servicing equipment. Concurrent servicing, loading, and maintenance must be conducted according to T.O. 00-25-172 and current checklists, which will be reviewed before concurrent operations. Current checklist procedures take precedence over T.O. 00-25-172 procedures.

6.24.2.2. Simultaneous fuel and oxygen servicing is not authorized.

6.24.2.3. Winching of rolling stock and non-spark producing (i.e. wooden) pallets is authorized. Driving vehicles equipped with spark arresters is authorized during fuel servicing. When loading vehicles without spark arresters, the vehicles must be either completely inside the cargo compartment, or outside of the established fuel servicing safety zone, before fuel servicing lines can be pressurized.

EXCEPTION: Diesel and turbo-charged (without waste gates) gasoline-powered vehicles can be on-loaded or off-loaded without having to stop fuel flow.

EXCEPTION: Passengers are prohibited in the cargo compartment during winching.

6.24.3. The following guidance will be used for fuel servicing (refuel) operations only:

6.24.3.1. Passengers are not allowed on board unless expressly directed by MAJCOM DO/XO, DIRMOBFOR, or in combat.

6.24.3.2. Electric and electronic equipment may be left on provided it does not radiate energy; but it must not be turned on or off during refueling.

6.24.3.3. TACAN and CARA must be turned off.

6.24.3.4. Radar may be in standby but if time permits should be turned-off.

6.24.3.5. IFF SIF may be in standby but if time permits should be turned-off.

6.24.3.6. SCNS/INS may be on and may have data inserted during refuel. Do not turn on or off during refuel operations.

6.24.4. Aircrew Dash One Preflight Inspection Requirements.

6.24.4.1. The aircrew dash one preflight inspection will remain valid until either:

6.24.4.1.1. Aircraft ground time exceeds 12-hours (72-hours provided the aircraft is sealed, not flown, and documented entry control is maintained).

6.24.4.1.2. Another maintenance dash six preflight is performed.

6.24.4.2. When an aircrew assumes a preflighted spare or quick turn, a thorough visual inspection will be performed.

6.24.5. Hot Refueling.

6.24.5.1. Hot refueling will only be conducted by crews that have been authorized and certified according to AFI 11-235, *Forward Area Refueling/Rearming Point (FARRP) Operations*.

6.24.6. Fire Protection and Crash Rescue.

6.24.6.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start.

6.24.6.2. A fireguard is required for all engine starts including the GTC/APU. A crewmember or ground controller may act as fireguard.

6.24.7. Aircrew and maintenance engine run-ups.

6.24.7.1. A mixture of aircrew and maintenance personnel will not normally accomplish engine runs. When an aircrew member is required to start or run up engines for maintenance purposes, the following procedures apply:

6.24.7.1.1. Maintenance personnel will accomplish all necessary inspections and preparations for the engine run. These actions include but are not limited to: intake/exhaust inspections, access panel security servicing, and AFTO Form 781 documentation.

6.24.7.1.2. Use the pilot, flight engineer, and loadmaster checklists. Begin with the "cockpit checklist," and complete all appropriate checklists through the "before leaving the airplane" checklist.

6.24.7.1.3. Deviate from the flight crew checklist only when maintenance requires less than four engines to be started.

6.24.7.1.4. Operate symmetrical engines when power settings above ground idle are required.

6.24.8. Towing. Aircrew members normally will not participate in towing operations. If required to occupy cockpit positions during towing operations conducted by personnel not familiar with C-130 towing procedures, the AC will coordinate with the senior maintenance officer or superintendent to ensure the towing supervisor and crew are qualified. At non-USAF installations, the AC must have approval from the airfield operations officer or manager prior to towing. The AC will ensure the tow team supervisor briefs all personnel on their duties and the associated hazards. Proper checklists will be used. If any doubt exists as to the qualification of tow team personnel or the safety of the operation, make no attempt to tow the aircraft until qualified Air Force personnel can be located. Under no circumstances will any crewmember act as the towing supervisor.

6.24.9. One-Time Flights. An aircraft may be released for a one-time flight with a condition that might be hazardous for continued use, provided the aircraft is airworthy for one flight to another station. This release must be authorized by the OG/CC, the senior maintenance officer, or the chief of the air logistics center (ALC) repair team and requires NAF/DO or AOC/ALCC Chief coordination. AFRC crews see AFI 11-202V3/AFRCSUP1. ANG crews on ANG missions will receive release authority from the OG/CC (or designated representative) or senior maintenance officer. After the maintenance release is obtained, coordinate mission requirements with the controlling agency. The AC's concurrence is required before the aircraft can be flown.

6.25. Aircraft Recovery Away from Main Operating Base (MOB). When an aircraft will land at a base other than the MOB, a crew chief should accompany the aircraft. The aircraft commander is responsible for ensuring the aircraft is turned to meet subsequent mission taskings. If qualified aircraft specialists are unavailable, the aircrew is responsible for turning the aircraft to meet subsequent mission taskings.

6.25.1. Recovery items the aircrew may be responsible for include, but are not limited to, the following:

6.25.1.1. Parking and receiving.

6.25.1.2. Aircraft servicing, including AGE usage.

6.25.1.3. Supervision of minor maintenance within local capability.

6.25.1.4. Minor configuration changes to meet mission tasking.

6.25.1.5. Securing the aircraft prior to entering crew rest.

6.25.1.6. Coordinating aircraft security requirements.

6.25.1.7. AFTO 781-series forms maintenance.

6.25.2. In all cases where aircrews turn aircraft without qualified maintenance specialist assistance, comply with the appropriate maintenance tech order.

6.25.3. Aircrews are not qualified to accomplish the required ground inspections. In those instances where maintenance personnel are not available, the aircrew will enter a red dash symbol in the AFTO Form 781H, **Aerospace Vehicle Flight Status and Maintenance Document**, updating current status and enter a red dash symbol and a discrepancy that reflects that the applicable maintenance inspection (i.e. pre-flight, thru-flight, basic post-flight) is overdue.

6.26. Life Support Requirements.

6.26.1. Oxygen. Oxygen on board for takeoff must be sufficient to accomplish the planned flight from the equal time point (ETP) should oxygen be required (minimum 5 liters or 300PSI).

6.26.1.1. Since the C-130 flight deck can accommodate more crewmembers than there are oxygen regulators, all C-130 aircraft will have three emergency escape breathing devices (EEBD), or emergency passenger oxygen system (EPOS), or passenger oxygen kits (POK) permanently pre-positioned on the aircraft. The EEBDs/EPOS/POKs may be stored on the overhead storage rack when not required on the flight deck.

6.26.1.2. On missions carrying passengers, distribute EPOS (if available) to each passenger regardless of planned flight altitude. If the POKs are used, the kits need only be positioned on the aircraft and distributed to each passenger for scheduled flights above FL250. Mixing EPOS and POKs on the same aircraft is not authorized. EPOS/POKs will be distributed and their use demonstrated prior to departure/exceeding FL250 as required.

6.26.1.3. Do not remove the loadmaster's emergency equipment (cargo compartment quick dons/smoke masks) for use by flight deck crewmembers.

6.26.1.4. Aircrew members will comply with the oxygen requirements in AFI 11-202V3.

6.26.1.5. Crewmembers occupying a crew station will have an oxygen mask connected and readily available for use from before engine start until engine shutdown.

6.26.1.6. Crewmembers who do not have access to the aircraft oxygen system will have a POK, or EEBD within arm's reach for flights above 10,000 feet.

6.26.1.7. Normally, unpressurized flight will not be planned above 18,000 feet cabin altitude (except HALO). Aircrews required to fly unpressurized missions above 18,000 will prebreathe 100 percent oxygen in accordance with **Chapter 19**.

6.26.2. Rafts. On overwater flights do not carry more passengers and crewmembers than wing well life rafts will accommodate.

6.26.3. Life preserver units (LPUs). The loadmaster will place an LPU within easy reach of each seated passenger and aircrew member prior to takeoff on overwater flights (outside gliding distance to land). Crewmembers will fit and adjust LPUs (if applicable) for overwater flights and will wear them on overwater missions below 2,000 feet. (**EXCEPTION**: LPUs need not be worn for takeoffs, landings, or approaches). Ensure the appropriate number and type of life preservers are aboard for overwater missions carrying children and infants.

6.26.4. Parachutes:

6.26.4.1. Parachutes will be carried on aircraft IAW AFI 11-302.

6.26.4.2. Personnel performing duties near an open (or suspected open) door/hatch/ramp in-flight will be restrained by a safety harness, or be wearing a parachute.

6.26.4.3. Either wear, or have pre-fit and pre-positioned parachutes and helmets during specified combat conditions or exercise. Loadmasters will wear a restraining harness instead of a parachute during airdrops below 800 feet AGL or when performing duties near an open exit above 14,000 MSL.

6.27. Fleet Service. Ensure required fleet service items are aboard the aircraft early enough to permit inventory 60-minutes before takeoff time.

6.28. Cargo Documentation. Proper cargo or mail documentation will accompany each load.

6.28.1. Load Data Information (Applicable to AFRC/ANG completing TACC-directed mission). At stations where there is no mobility air transportation function, the aircrew will collect the required load information on each leg, and submit it to the first station, which has such a function. The report will be submitted on AF Form 4075, **Aircraft Load Data Worksheet**.

6.29. Procedures for Airlifting Hazardous Cargo.

6.29.1. The term "hazardous cargo" as used in conjunction with airlift operations, applies to the following classes and types of materials covered by AFJMAN 24-204:

6.29.1.1. Class 1 (Explosives)

6.29.1.2. Class 2 (Compressed gas)

6.29.1.3. Class 3 (Flammable liquid)

6.29.1.4. Class 4 (Flammable solid)

6.29.1.5. Class 5 (Oxidizer and organic peroxide)

6.29.1.6. Class 6 (Poison and infectious substances)

6.29.1.7. Class 7 (Radioactive material)

6.29.1.8. Class 8 (Corrosive material)

6.29.1.9. Class 9 (Miscellaneous dangerous goods)

6.29.2. Procedures in paragraph **6.29.2.**. apply when aircraft carry any quantity of the following materials.

6.29.2.1. DoD class or division 1.1, 1.2, 1.3 (explosives)

6.29.2.2. Class or division 2.3 (poison gas)

6.29.2.3. Class or division 6.1, (poison) PG I, zone A and B

6.29.2.4. Class 7 (radioactive yellow III label.)

6.29.2.5. Class 4.3 (dangerous when wet)

6.29.2.6. Nuclear weapons, nuclear components, inert devices

6.29.2.7. DoD hazard class or division 1.4 explosives that transit the United Kingdom, Italy, or Hawaii.

6.29.3. Procedures also apply to nuclear related cargo, toxic chemical ammunition, highly toxic substances, hazard division 1.1 through 1.3 explosives, and infectious substances (including biological and etiological materials). In addition, it applies to Class 7 (Radioactive materials), which require a yellow III Label, and all other hazard classes or divisions, (except class 9 and other regulated material (ORM-D)) when shipped in quantities of 1,000 pounds (455 Kgs) or more aggregate gross weight.

NOTE: Quantities not covered in Paragraphs **6.29.2.** and **6.29.3.** are exempt from these procedures.

6.29.4. The following procedures are established to satisfy the reporting requirements of AFJI 11-204, *Operational Procedures for Aircraft Carrying Hazardous Materials*. (Nuclear weapons, nuclear components, and inert devices are covered in AFI 11-299, *Nuclear Airlift Operations*:

6.29.4.1. The AC will be briefed when the quantities specified in paragraph **6.29.2.** and paragraph **6.29.3.** are involved. The briefing will cover the following points:

6.29.4.1.1. Hazard class.

6.29.4.1.2. Proper shipping name.

6.29.4.1.3. DoD class or division when any type explosives are involved.

6.29.4.1.4. Net explosives weight (NEW) for all DoD class or division 1.1, 1.2, and 1.3 explosives and gross weight of blasting agent aboard the aircraft.

6.29.4.1.5. Gross weight of hazardous materials other than the explosives above.

6.29.4.1.6. Passenger restrictions.

6.29.4.1.7. Written notification indicating "prior permission required" (PPR), obtained from the next base to be transited.

6.29.4.1.8. Smoking restrictions.

6.29.4.1.9. Flight plan annotation requirements.

6.29.4.1.10. Isolated parking and taxiing requirements.

6.29.4.1.11. Security classification, if appropriate.

6.29.4.1.12. Notification of the requirement to contact the next base to be transited at least 30 minutes prior to landing. (Such contact is not required for quantities other than those in paragraph **6.29.2.** and paragraph **6.29.3.**).

6.29.4.1.13. Placard requirements.

6.29.4.1.14. Escort team requirement, if applicable.

6.29.4.1.15. Other special handling requirements.

6.29.4.2. Cargo documentation and loading procedures.

6.29.4.2.1. The loadmaster will ensure proper documentation, certification and identification of cargo is furnished. AFJMAN 24-204 contains detailed instructions on packaging, marking, labeling, and certification requirements associated with the airlift of hazardous materials. Hazardous materials/cargo not properly packaged and documented in accordance with AFJMAN 24-204 will be rejected for air shipment by the loadmaster.

6.29.4.2.2. Hazardous materials/cargo falls into many categories and the utmost precautions must be observed when handling or transporting these items. Load all hazardous material to permit easy access in-flight without moving other cargo. Load jettisonable hazardous material to facilitate jettisoning. Adhere to the following appropriate safety precautions when loading hazardous cargo as appropriate:

6.29.4.2.2.1. Ventilate the aircraft.

6.29.4.2.2.2. Placard the aircraft.

6.29.4.2.2.3. No smoking.

6.29.4.2.2.4. Fire extinguishers must be available.

6.29.4.2.2.5. Thoroughly inspect the cargo.

6.29.4.2.2.6. Stow cargo away from heater outlets.

6.29.4.2.2.7. Notify medical personnel in case of damage to radioactive materials.

6.29.4.2.2.8. Use protective clothing and equipment.

6.29.4.3. Flight Planning. When briefed according to paragraph **6.29.4.1.**, the AC will:

6.29.4.3.1. Enter "Hazardous Cargo" and the mission identifier or flight number in the appropriate section of the flight plan. (Use remarks section of DD Form 175, and other information section of DD Form 1801.) Refer to the FCG for country specific requirements concerning over-flight when transporting hazardous materials cargo.

6.29.4.3.2. If possible, plan the flight to minimize over-flying heavily populated or otherwise critical areas. Approach, landing, and takeoff tracks are excluded.

6.29.4.3.3. Prepare a departure message at stations when a C2 center is not available. The remarks section of the departure message should include the following information:

6.29.4.3.3.1. Class of hazardous material aboard and the DoD class or division for explosives and NEW. Include the gross weight for the materials in paragraph **6.29.3.**.

6.29.4.3.3.2. Request for special handling; for example, isolated parking, security, technical escort teams, etc.

6.29.4.3.4. If estimated time enroute (ETE) is less than 1-hour, or if other circumstances preclude timely message receipt at destination, notify the base of first intended landing by priority telephone of the ETA and information listed in paragraph **6.29.4.3.3.**. If available, ask the C2 center at the departure base to relay this information to base operations at the point of first intended landing when a C2 is available.

6.29.4.4. Before engine start. Remove placards, when used, from the aircraft. Give the controlling agency parking location, approximate engine start time, and verify the fire fighting agency has the hazardous materials information; otherwise, request the following be relayed to the fire fighting agency:

6.29.4.4.1. Class of hazardous material aboard and the DoD class or division for explosive materials aboard.

6.29.4.4.2. NEW for DoD class or division 1.1, 1.2, and 1.3 explosives.

6.29.4.4.3. ETD.

6.29.4.5. Enroute. Normal procedures apply. Comply with paragraph **6.29.4.3.2.**.

6.29.4.6. Before landing. Unless specifically prohibited by the theater commander or FLIP planning or the Foreign Clearance Guide, contact the agency specified in FLIP/FCG, base operations dispatcher, control tower or approach control at least 30 minutes (or as soon as practical) before ETA to announce that "hazardous materials" are aboard and to verify that the hazardous materials/cargo message has been received. Transmit the mission number, ETA, and information in paragraph **6.29.4.3.3.**. Request the information be relayed immediately to base operations or the civil airport manager, crash and fire protection agency, and other support activities. If landing at a United States civil airport without a tower, give the above information to the nearest FAA flight service station.

6.29.4.7. DoD requires aircraft carrying DoD class or division 1.1, 1.2, and 1.3 explosives, hazardous class or division 2.3 or 6.1 zone A materials, and munitions to be parked in areas isolated from non-associated personnel and facilities. When such cargo is aboard, The AC is responsible for ensuring the cargo is correctly identified to the tower or ground control. If the aircraft is not directed to an isolated area, identify the cargo again to tower or ground control. When identification is acknowledged, the host is solely responsible for selecting the parking area. Should host procedures be questionable, submit trip reports or hazard reports as appropriate, to document such occurrences.

6.29.4.8. The military host is responsible for placarding aircraft. When missions operate on non-military bases, the briefing to the AC will include placarding requirements and, if required, placards will be furnished at the on-load base. The shipper and receiver must make prior arrangements with the airport manager for shipments of hazardous materials requiring placarding. The shipper and receiver are responsible for cargo identification, fire fighting procedures, and isolated parking requirements.

6.29.4.9. Unscheduled Landing Due to In-flight Emergency. Transmit unclassified information to the appropriate ATC facility as follows:

6.29.4.9.1. Nature of emergency and intent to land.

6.29.4.9.2. Aircraft position and ETA.

6.29.4.9.3. Number of personnel and location in aircraft.

6.29.4.9.4. Fuel on board.

6.29.4.9.5. Hazardous materials aboard, location of the cargo, and information listed in paragraph **6.29.4.3.3.**.

6.29.4.10. After Unscheduled Landing. Contact the appropriate C2 center by telephone, HF radio, or message, giving arrival notice, hazardous materials information, and other pertinent information, as required.

6.30. Handling of Classified Cargo, Registered Mail, Not Mission Capable Supply (NMCS), Very, Very Important Part (VVIP), Forward Supply System (FSS) Shipments, and Courier Material.

6.30.1. MICAP, VVIP, sensitive cargo, courier materials, and registered mail moving within the normal airlift system are receipted at the on and offload stations using the air cargo manifest. For unit moves operated in accordance with Defense Transportation Regulation (DTR), Part III, Mobility, classified or sensitive cargo movement is normally manifested utilizing the DD Form 2130-2, **C-130A/B/E/H Cargo Manifest** or similar automated product (such as CALM or AALPS), and will normally be accompanied by a unit courier. However, if classified/sensitive unit cargo is offered without an accompanying courier, the DD Form 1907, **Signature Tally Record,** must be used.

6.30.1.1. Defense Courier Service (DCS) couriers coordinating with the AC are authorized to designate officer or enlisted, (E-5 and above) crewmembers on military aircraft as couriers to escort and safeguard courier material when other qualified personnel are not available. Qualified passengers, if carried, are designated prior to designating crewmembers. The following restrictions apply:

6.30.1.1.1. Primary crewmembers will not be designated couriers without the consent of the AC.

6.30.1.1.2. Crewmembers on aircraft scheduled to make an extended enroute stop at a location where DCS couriers cannot provide enroute support will not be designated as couriers.

6.30.2. During stops at enroute locations supported by DCS stations, DCS couriers are required to meet designated couriers, guard and protect the material.

6.30.2.1. During unscheduled enroute stops crewmembers may place courier material in temporary custody of the following agencies in descending order of priority.

6.30.2.1.1. DCS courier.

6.30.2.1.2. TOP SECRET control officer of the US armed forces.

6.30.2.1.3. US Department of State Diplomatic Courier.

6.30.2.1.4. US Department of State activity.

6.30.2.1.5. US military guards.

6.30.2.1.6. US DOD civilian guards.

6.30.3. If unable to follow the itinerary to the destination of the courier material, or material is lost, stolen or otherwise compromised, report circumstances to the nearest Defense Courier Station and notify the local US military commander or US Government activity.

6.30.4. Life or death urgency shipments consist of biological or other medical supplies of such urgency that human life is dependent upon immediate receipt. Shipments will be manifested separately and the manifest annotated with the words LIFE OR DEATH URGENCY. All shipments will be handled on a hand-to-hand receipt basis, using either the air cargo manifest or the DD Form 1907,

Signature Tally Record, for unit moves. The AC will be briefed on the urgency of the shipment and be made the custodian during flight.

Section 6D—Departure

6.31. On Time Takeoffs. Mission departures (home or rotational station) are on time if the aircraft is airborne within -20/+14 minutes of scheduled takeoff time or as specified in a MAJCOM supplement.

6.31.1. Tactical Missions. Scheduled takeoff time may be adjusted to make good a time over target (TOT) or time of arrival (TOA). Notify controlling agency prior to takeoff to adjust the scheduled takeoff time.

6.31.2. Early Departures:

6.31.2.1. Home Station. Early departures are authorized to prevent a delay due to weather, ATC restrictions, airfield or aircraft operational limitations, to adjust mission flow during a large scale operation, or if approved through C2 channels.

6.31.2.2. Enroute Stations. Early departures at enroute stations may be authorized through C2 channels, provided the impact on local and downrange facilities and crew duty is evaluated.

6.32. Not Used.

Section 6E—Enroute

6.33. Flight Progress.

6.33.1. Prior to an oceanic flight, plot the oceanic portion of the flight on an appropriate chart. Annotate the chart with the mission number, preparer's name, and date. If practical, chart may be reused.

6.33.2. Anytime waypoint data is inserted into the SCNS/INS, it will be verified by another pilot or navigator. Check both the coordinate information and the distances between waypoints against the flight plan.

6.33.3. In-flight, use all available navigational aids to monitor SCNS/INS performance. Immediately report malfunctions or any loss of navigation capability that degrades centerline accuracy to the controlling air route traffic control center (ARTCC). Use the following procedures for flight progress.

6.33.3.1. When approaching each waypoint, recheck coordinates for the next waypoint.

6.33.3.2. Approximately 10 minutes after passing each oceanic waypoint, record and plot the aircraft position and time on the chart, and ensure compliance with courses and ETA tolerances.

6.33.3.3. If a revised clearance is received, record and plot the new route of flight on the chart.

6.33.4. Upon return to home station, turn in the charts (copies if reused) and applicable computer flight plans to the squadron. Squadrons will retain the charts, CFPs, and associated materials for a minimum of 3 months.

6.33.5. Operations in International/Territorial Airspace. (See FLIP, FCG, and AP, for further guidance). US military aircraft and DoD personnel entering another nation to conduct US government business therein must have the approval of the foreign government concerned to enter their airspace.

Foreign clearances for US international air operations are obtained through US officials known as Defense Attaché Officers (DAOs).

6.33.5.1. There are essentially two types of airspace: international airspace and territorial airspace. International airspace includes all airspace seaward of coastal states' territorial seas. Military aircraft operate in such areas free of interference or control by the coastal state. Territorial airspace includes airspace above territorial seas, archipelagic waters, inland waters, and land territory, and is sovereign airspace. Overflight may be conducted in such areas only with the consent of the sovereign country.

6.33.5.2. Consistent with international law, the US recognizes sea claims up to 12NMs. Diplomatic constraints and/or a lack of diplomatic clearances usually result in missions operating in international airspace. Therefore, it is imperative sufficient information be provided far enough in advance to allow compliance with FCG requirements established by the countries concerned. The US does not normally recognize territorial claims beyond 12NMs; however, specific guidance from certain US authorities may establish limits, which differ from the standard.

6.33.5.3. Flight Information Region (FIR). An FIR is an area of airspace within which flight information and related services are provided. An FIR does not reflect international borders or sovereign airspace. Aircraft may operate within an established FIR without approval of the adjacent country, provided the AC avoids flight in territorial airspace.

6.33.5.4. Aircrews on a flight plan route, which takes them from international airspace into territorial airspace, for which approved aircraft clearances were obtained, should not amend entry point(s).

6.33.5.5. Violations of foreign sovereignty result from unauthorized or improper entry or departure of aircraft. Aircrews should not enter into territorial airspace for which a clearance has not been duly requested and granted through diplomatic channels.

6.33.5.6. Air traffic control agencies are not vested with authority to grant diplomatic clearances for penetration of sovereign airspace where prior clearance is required from the respective country. Aircraft clearances are obtained through diplomatic channels only.

6.33.5.7. In the event air traffic control agencies challenge the validity of a flight routing or attempt to negate existing clearances, pilots must evaluate the circumstances. The normal response will be to attempt to advise the air traffic control agency that the aircraft will continue to planned destination, as cleared in international airspace. The key phrase is "in international airspace." Safety of flight is paramount in determining mission continuation. Under no circumstances should aircrews construe a clearance, which routes their mission over sovereign airspace, which was not approved through diplomatic channels prior to mission departure, as being valid authorization.

6.33.5.8. Aircrews operating missions requiring unique or specially developed routing will normally be briefed at home station, onload station, and/or by the last C2 facility transited prior to performing the critical portion of the mission.

6.33.5.9. Aircrews (except on weather reconnaissance missions) normally are not tasked to and should not fly "due regard" routings unless specifically directed in the mission FRAG or for AMC-directed missions, coordinated with the appropriate authorities by TACC. The "due regard" or "operational" option obligates the military AC to be their own ATC agency to separate their aircraft from all other air traffic. If operational requirements dictate, ACs may exercise the "due regard" option to protect their aircraft. When the threat has terminated, the aircraft will return to normal air traffic services.

6.34. Navigational Aid Capability.

6.34.1. North Atlantic MNPS airspace and PACOTS, NOPAC, and Hawaiian Track procedures are as follows:

6.34.1.1. MNPS standards (FLIP AP/2) are mandatory in North Atlantic MNPS airspace.

6.34.1.2. Aircraft that lose required equipment prior to oceanic airspace entry will return to the nearest maintenance repair facility.

6.34.2. Reduced Vertical Separation Minimum (RVSM) Airspace. Airspace where RVSM is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. Refer to FLIP AP/2 and the following for RVSM requirements:

6.34.2.1. Both primary altimeters, at least one autopilot, the altitude advisory system, and the transponder, must be fully operational prior to entry into RVSM airspace. Should any of this equipment fail prior to entering RVSM airspace, request a new clearance so as to avoid this airspace.

6.34.2.2. The autopilot should be engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement.

6.34.2.3. Crosscheck the altimeters prior to or immediately upon coast out. Record readings of both altimeters and retain for use in contingency situations.

6.34.2.4. Continuously crosscheck the primary altimeters to ensure they agree ± 200 feet.

6.34.2.5. Aircrews should limit climb and descent rates to 1,000 feet per minute when operating in the vicinity of other aircraft to reduce potential effects on TCAS operations.

6.34.2.6. Should any of the required equipment fail after entry into RVSM airspace, immediately notify ATC and coordinate a plan of action.

6.34.2.7. Document (in the aircraft forms) malfunctions or failures of RVSM required equipment, including the failure of this equipment to meet RVSM tolerances.

6.34.3. Required Navigation Performance (RNP) Airspace. Airspace where RNP is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. RNP airspace is being incorporated around the world to increase air traffic capacity by decreasing separation requirements between routes. The C-130 is approved for RNP operations only with a qualified navigator at the navigator's station, but limited to operational time restrictions based on the navigation equipment.

6.34.3.1. RNP-10. Compliance includes navigation accuracy within 10NM of actual position 95% of the time. Aircraft with integrated GPS with receiver autonomous integrity monitoring (RAIM) or equivalent system have no RNP-10 restrictions. Aircraft not possessing integrated GPS with RAIM, or equivalent system, are limited in how long they may operate in RNP-10 airspace. The C-130 may operate up to 6.2-hours (after entering the nav mode in SCNS) of flight in

RNP-10 airspace without an update. If an automatic update (TACAN update) is made, the aircraft may continue for an additional 5.7 hours in RNP-10 airspace after the update is complete. If an manual update (Radar update, etc) is made, the aircraft may continue for an additional 5.2-hours in RNP-10 airspace after the update is complete The following are RNP-10 requirements:

6.34.3.1.1. To increase the 6.2-hour baseline, data collection on long overwater legs must still be accomplished and submitted to HQ AMC/XPY.

6.34.3.1.2. Until C-130s receive integrated GPS or extend their baseline, NOPAC will require TACAN updates to be RNP-10 compliant. Shemya TACAN must be operational. When abeam Shemya a position crosscheck will be made. If inertial position is more than 3 NM from TACAN fix position, a TACAN update must be accomplished on all inertial units exceeding this limit.

6.34.3.1.3. Flight Planning. Verify aircraft is approved for RNP operation, access mission impact and verify the letter "R" is annotated in block 10 of the DD Form 1801, **International Flight Plan**.

6.34.3.1.4. Preflight Procedures. Review maintenance logs to ascertain status of RNP-10 equipment and particular attention should be paid to navigation antennas and the condition of the fuselage skin in the vicinity of these antennas.

6.34.3.1.5. Enroute. At least two long-range navigation systems certified for RNP-10 must be operational at the oceanic entry point (INS/GPS, INS/Navigator). Prior to entering Oceanic Airspace, the aircraft's position should be checked as accurately as possible by using external navigation aids (coast-out fix). Periodic crosschecks will be accomplished to identify navigation errors and prevent inadvertent deviation from ATC cleared routes. Advise ATC of the deterioration or failure of navigation equipment below navigation performance requirements and coordinate appropriate actions.

6.34.3.1.6. Document (in the aircraft forms) malfunctions or failures of RNP required equipment, including the failure of this equipment to meet RNP tolerances.

6.34.4. Basic Area Navigation (BRNAV) Airspace. Airspace where BRNAV is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. BRNAV navigation accuracy criteria is RNP-5. The C-130 is approved for BRNAV operations only with a qualified navigator at the navigator's station. Aircraft with integrated GPS have no BRNAV restrictions. Without integrated GPS, aircraft must auto update every two hours to maintain actual centerline within +/- 5 NM of ATC cleared route.

6.34.4.1. Minimum equipment to operate in BRNAV airspace is one INS capable of updates or an approved GPS with RAIM or equivalent system. Flights entering BRNAV airspace after long overwater flight must be especially aware of BRNAV tolerances and update accordingly.

6.34.4.2. Aircraft unable to maintain BRNAV tolerances must advise ATC immediately and take appropriate coordinated action.

6.34.4.3. Document (in the aircraft forms) malfunctions or failures of BRNAV required equipment, including the failure of this equipment to meet BRNAV tolerances.

6.35. CIRVIS and Other Reports. Report all vital intelligence sightings from aircraft as indicated in FLIP planning or FLIP Enroute Supplement.

6.35.1. In-flight harassment or hostile action against C-130 aircraft. Aircraft subjected to harassment or hostile action by foreign aircraft will immediately contact the nearest USAF air and ground voice facility and report the encounter. Include aircraft nationality, type, insignia, or any other identifying features; note position, heading, time, speed when harassed, and the type of harassment. Request relay of the report to the nearest C2 agency. Also attempt to contact the nearest command post when in UHF and VHF range.

6.35.2. Other incidents will be reported as indicated in JCS Pub 6V5 and AFMAN10-206, *Operational Reporting*.

6.36. In-flight Meals. The pilot and the copilot should not eat meals at the same time, and their meals should consist of different menu items.

6.37. Communications.

6.37.1. HF Communications (according to AFR 700-20). Confine message traffic to essential operational matters. Perform an HF radio ground check prior to takeoff if the use of HF radio may be required for ATC or C2 communications. Establish HF contact before going out of UHF and VHF range. If unable to establish HF contact with the controlling HF station, and an alternate means of relay of ATC information in oceanic areas is not available, return to the nearest suitable support base.

6.37.2. General. Provide ARTCC position and weather observations when required. If unable to contact an ATC agency, attempt relay through the GLOBAL HF stations.

6.37.3. AF Form 72, **Air Report (AIREP).** When directed by departing weather facility, take and record an AIREP at each position report over a Category I Route. Identify inaccurate CFP winds by special report if the average wind for a route segment exceeds either 30 degrees error in wind direction or 25 knots in wind speed. Turn in completed AF Form 72 to the destination USAF weather facility.

6.38. In-flight Emergency Procedures. Report deviations from directives that may occur as a result of an emergency according to AFI 11-202V3.

6.38.1. Notification of Controlling Agencies. When practical after completing the aircraft emergency action checklists and associated actions, crews should furnish the controlling agency and appropriate C2 agencies with a description of the difficulty, assistance required, intentions, and any other pertinent information.

6.38.2. A CONFERENCE SKYHOOK may be initiated when additional expertise is necessary to cope with emergencies or other conditions. Communications procedures are as follow:

6.38.2.1. Local Area. When in UHF or VHF range, initiate the conference over appropriate frequencies.

6.38.2.2. Enroute. When out of UHF range, use HF radios to establish a phone patch with the nearest or controlling C2 center as appropriate.

6.38.2.3. Provide the following information when time permits.

6.38.2.3.1. Narrative description of the situation to include actions taken by the crew and the intentions of the AC.

6.38.2.3.2. What assistance is being requested

6.38.2.3.3. Fuel on board and hours of endurance.

6.38.2.3.4. Position.

6.38.2.3.5. Altitude and flight conditions.

6.38.2.3.6. Number of personnel and distinguished visitors (DV) on board.

6.38.2.3.7. Qualification of AC.

6.38.2.3.8. Planned landing base.

6.38.2.3.9. ETA at landing base.

6.39. Need for Medical Assistance. When a person aboard the aircraft requires medical care, inform the station of intended landing in sufficient time so the aircraft may be met by medical personnel. Include the patient’s sex, approximate age, and the major complaint in the request.

6.40. Weather Forecasts.

6.40.1. It is the pilot's responsibility to obtain destination weather prior to descent.

6.40.2. The primary means is any USAF base weather station via pilot-to-meteorologist service (PMSV) or through a USAF aeronautical station. Check on the latest weather prior to descent or landing.

6.40.3. For aircraft flying in EUCOM AOR (ENAME operations) contact USAFE/OWS at Sembach AB GE (DSN 314-496-6145). SOUTHCOM AOR contact 25 OWS at Davis-Monthan AFB, AZ (DSN 228-1977).

6.40.4. The ATC system can provide weather information to enroute aircraft.

6.40.4.1. The ARTCCs have a limited capability to provide weather information to enroute aircraft within CONUS.

6.40.4.2. SIGMET (significant meteorological information) advisories will be transmitted from the servicing ATC unit. Crews will consider all SIGMETs valid for their aircraft until verified as not applicable with a military METRO service.

Section 6F—Arrival

6.41. Descent. Prior to descent into unfamiliar areas, appropriate terrain charts (Operational Navigation Chart (ONC), Sectional Aeronautical Chart, Tactical Pilotage Chart (TPC), or Joint Operations Graphic (JOG)) should be reviewed to increase aircrew situational awareness of obstructions. Primary crewmembers will not be involved in duties other than aircraft operations, descent and approach monitoring, and required checklist items from the initial descent point to landing.

6.41.1. Night and Marginal Weather Operations. Fly a precision approach, if available, at night or during marginal weather. If a precision approach is not available, fly any available approved instrument approach. During night VFR conditions, if an approved instrument approach is not available, a visual approach may be flown. On training and evaluation flights at familiar fields, pilots may fly non-precision approaches or VFR traffic patterns to accomplish required training and evaluations.

The navigator and pilot not flying the approach will monitor any approach when practical to enhance safety.

6.42. Instrument Approach Procedures.

6.42.1. Instrument approach RVR/visibility and, if required, ceiling minimums will be as published for a category "C" aircraft. If approach speeds exceed 140 knots, the minimums for category "D" will be used. Before starting an instrument approach, or beginning an en route descent, pilots will confirm that existing weather is reported to be:

6.42.1.1. At or above required visibility for a DoD or National Oceanic and Atmospheric Administration (NOAA) precision approach criteria:

6.42.1.2. At or above required ceiling and visibility for all other approaches. For approaches with no published ceiling requirement (for example Jeppesen approaches), the minimum required ceiling shall be computed by taking the published HAA or HAT and rounding it up to the nearest one hundred feet or as determined by MAJCOM TERPS review. For example, a Jeppesen VOR approach with a published HAA of 642-feet would require an existing ceiling of 700-feet (plus the published visibility) prior to commencing the approach or en route descent.

NOTE: Pilots shall increase the published visibility minimums of an instrument approach by ½ SM or as noted in NOTAMs, on ATIS, or on the approach plate, when the runway approach lighting system (ALS) is inoperative. (This applies only to the ALS itself, not to VASIs, PAPIs, and other lights that are not a component of the ALS.)

6.42.1.3. Aircraft are limited to a DH/MDA based on a HAT of 300-feet and RVR 40, or ¾-mile visibility (1220-meters) with no RVR if full flight instrumentation is not available and operational.

NOTE 1: Full flight instrument for a Category I ILS is dual flight displays (one flight director plus ADI repeat), complete differential pressure instruments, heading/compass systems, and attitude indicators in the pilot and copilot positions.

NOTE 2: Full flight instrumentation for a precision approach radar (PAR) is complete differential pressure instruments, heading/compass systems, and attitude indicators in the pilot and copilot positions.

6.42.2. Prior to starting an instrument approach, pilots will confirm their aircraft can meet or exceed all climb gradients specified in the missed approach procedure, based on the number of engines operating when the approach is begun. If missed approach climb charts are not available, use the takeoff obstacle clearance charts. If unable to meet required climb gradients, pilots must coordinate alternate missed approach procedures with ATC, which will ensure terrain clearance, prior to commencing the approach. If this is not possible, do not attempt the approach.

6.42.3. If ceiling is below value depicted for published DoD or NOAA precision approach, but visibility is at or above authorized minimums, the pilot will comply with fuel requirements of **Chapter 14**, prior to initiating en route descent, penetration, or approach.

6.42.4. For a precision approach, the DH will provide a height above touchdown of 200 feet or higher. For PAR approaches, visibility will be no lower than RVR 2400 (730-meters) or ½-mile visibility (800-meters) with no RVR readout available.

6.42.5. Circling Approach. The MDA will be as published for category aircraft. If the minimums are not published by category, the minimum altitude will be as published, but no lower than the value indicated below, plus the published airport elevation:

6.42.5.1. Category C - 500 feet - 1 ½-SM.

6.42.5.2. Category D - 600 feet - 2-miles.

6.42.6. Established on a Segment of the Approach. If established on a segment of the approach or being radar vectored to final approach and the weather is reported or observed to be below approach minimums, the AC has the option of continuing the approach to the missed approach point (MAP)/DH. If deciding to abandon the approach, level off (or descend if a lower altitude is required for the missed approach procedure). Comply with the last assigned clearance until a new or amended clearance is received.

6.42.6.1. Do not continue the approach below minimums unless the aircraft is in a position to make a safe landing and the runway environment is in sight.

6.42.6.2. If the approach is continued, the AC must plan to have sufficient fuel available to complete the approach and missed approach, and proceed to a suitable alternate with normal fuel reserve.

6.42.6.3. The AC has final responsibility for determining when the destination is below designated minimums, and for initiating proper clearance request.

6.42.7. An aircraft may hold at a destination that is below landing minimums, but forecast to improve to or above minimums provided:

6.42.7.1. The aircraft has more fuel remaining than that required to fly to the alternate and hold for the appropriate holding time, and the weather at the alternate is forecast to remain at or above alternate filing minimums for the period, including the holding time.

6.42.7.2. Destination weather is forecast to be at or above minimums before excess fuel will be consumed.

6.42.8. Alternate flight publications. The following publications are authorized if acceptable DoD FLIP products are not available:

6.42.8.1. NOAA.

6.42.8.2. Jeppesen and host government instrument approach and departure procedures may be used if approved by the appropriate MAJCOM according to AFI 11-202V3. Crews will contact controlling agency to confirm MAJCOM approval prior to flying these approaches. If not MAJCOM approved, these approaches may not be used in IMC.

6.43. Classified Equipment and Material. Comply with the following or as directed in MAJCOM supplement.

6.43.1. Equipment. When classified equipment is onboard, ensure the C2 center or base operations office is aware of the requirement for aircraft security according to **Chapter 7**. At bases not under jurisdiction of the Air Force, ensure the aircraft and equipment are protected. AFI 31-401, *Managing the Information Security Program*, provides specific guidance concerning the security of various levels of classified equipment aboard aircraft. Do not leave unguarded classified information stored in navigation or radio equipment (i.e., GPS-P Codes, INS, SCNS, Doppler, KY-58, KY-75, etc.).

6.43.2. Material. Ensure Communications Security (COMSEC) and other classified materials are turned in at destination and receipts are obtained for COMSEC and classified material. The on-site C2 center will provide temporary storage for COMSEC and other classified materials during enroute, turnaround, and crew rest stops. If a storage facility is not available, the aircraft gun storage box may be used for material classified up to and including SECRET. Encrypted COMSEC will only be transferred to authorized DoD personnel.

6.43.3. Aircrews will ensure that they have an operable Mode 4 when required for mission accomplishment. Aircrews will conduct an operational ground test of the Mode 4 (ground test assets permitting) prior to deployment overseas, or as specified in the OPORD or contingency/exercise tasking.

6.43.4. Attempt to fix an inoperable Mode 4 prior to takeoff. Do not delay takeoff nor cancel a mission for an inoperable Mode 4, except when the aircraft will transit an area where safe passage procedures are implemented.

6.43.5. Conduct an in-flight check of the Mode 4 on all missions departing the CONUS for overseas locations. Aircrews can request the Mode 4 interrogation check through NORAD on UHF frequency 364.2.

6.43.6. Aircraft with inoperable Mode 4 will continue to their intended destinations. Repairs will be accomplished at the first destination where equipment, parts, and maintenance technicians are available. In theaters where safe passage is implemented, aircraft will follow procedures for inoperable Mode 4 as directed in the applicable airspace control order or Air Tasking Order (ATO).

6.43.7. Ground and in-flight checks of the Mode 4, when conducted, are a mandatory maintenance debrief items. Crews will annotate successful and unsuccessful interrogation of the Mode 4 on all aircraft forms (AFTO Form 781A).

6.43.8. Aircrews will carry COMSEC equipment and documents required to operate the Mode 4 on missions when required for mission accomplishment. Prior to departing for any destination without COMSEC storage facilities, crews will contact their local COMSEC managers for guidance.

6.44. Unscheduled Landings. When an unscheduled landing or crew rest occurs at a base without a passenger facility, the AC should immediately advise the appropriate C2 and request assistance in arranging substitute airlift for passengers that are aboard. The following procedures apply when obtaining support for service members, in a group travel status, who are transported on AMC organic aircraft flying a Transportation Working Capital Fund (TWCF) mission, which incur an unscheduled delay due to weather or maintenance problems, forcing the members to be lodged at that location until the aircraft can continue its mission.

6.44.1. If the delay is at a location where DoD facilities and AMC TWCF funds are available, payment for lodging (contract or on-base) will be made by the local accounting liaison/OPLOC citing TWCF funds. The appropriate TWCF fund cite may be obtained from the local financial analysis and/or accounting liaison office. Normally, a BPA contract or AF Form 616 is already established at these locations to charge the routine lodging costs for transient or TDY individuals who are on TWCF funded travel orders.

6.44.2. If the delay is at a location where DoD facilities are available and AMC TWCF funds are not available, the AC will utilize AF Form 15, **United States Air Force Invoice** authority to acquire the appropriate lodging accommodations. Upon return to home station, the AC will send the AF Form 15 to the local accounting liaison office. A copy of the service members' group travel orders, along with any other pertinent supporting data, must accompany the form (e.g., lodging invoice and/or receipts). When the AF Form 15 has been validated, it will be forwarded on to the servicing OPLOC for payment, citing the funds of the unit whose aircraft was delayed.

6.44.3. If the delay is at a location where both DoD facilities and TWCF funds are unavailable, the AC will utilize AF Form 15 authority to acquire the appropriate meals, quarters, and transportation to support the service members. Upon return to home station, the AC will send the AF Form 15 to the local accounting liaison office. A copy of the service members' group travel orders, along with any other pertinent supporting data, must accompany the form (e.g., lodging invoice and/or receipts). When the AF Form 15 has been validated, it will be forwarded on to the servicing OPLOC for payment, citing the funds of the unit whose aircraft was delayed.

NOTE: This policy does not apply to those passengers on delayed TWCF organic aircraft who are in a per diem or space available status, except for those duty passengers on TWCF funded travel orders delayed at locations where TWCF funds are available.

6.45. Maintenance. Complete the AFTO Form 781 after each flight. After landing, crewmembers debrief maintenance personnel on the condition of the aircraft, engines, avionics equipment, and all installed special equipment as required. At stations without maintenance support, when a maintenance requirement exists the AC will ensure a thorough debrief is provided to the C2 agency, and the MAJCOM Logistics Readiness Center is notified prior to entering crew rest.

6.45.1. Aircrews are not qualified to accomplish the required maintenance inspections. In those instances where maintenance personnel are not available, the aircrew will enter a red dash symbol in the AFTO Form 781H, **Aerospace Vehicle Flight Status and Maintenance Document,** updating current status and enter a red dash symbol and a discrepancy that reflects that the applicable maintenance inspection (i.e., preflight, thru-flight, basic post-flight) is overdue.

6.45.2. An entry will be placed in AFTO 781A, "Aircraft Subjected to Salt Spray" (state lowest altitude and duration) anytime the aircraft is flown under 1000 feet above sea except for takeoffs and landings.

6.46. Border Clearance:

6.46.1. Normal Operations:

6.46.1.1. The unit dispatching the mission is normally responsible for the border clearance of its aircraft.

6.46.1.2. When support is not available, border clearance is the responsibility of the AC. Duties may be assigned to ground personnel or to the loadmaster, but the AC retains ultimate responsibility. When a C-130 aircraft is onloaded at a base without an air traffic function, the AC is responsible for ensuring the following:

6.46.1.2.1. Crewmembers, troops, and passengers possess current passports and valid visas, when required.

6.46.1.2.2. Crewmembers, troops, and passengers have current certificates of immunization (shot record).

6.46.1.2.3. Cargo entry documents are in proper order.

6.46.1.2.4. Departing or entering the United States through a location where border clearance can be obtained.

6.46.1.2.5. Obtaining border clearance for aircraft cargo, passengers, crew and baggage, if required, before takeoff to a foreign area or after arrival from a foreign area.

6.46.1.2.6. Spraying the aircraft (see the FCG and paragraph **6.47.**).

6.46.2. Procedures for US Entry.

6.46.2.1. Enroute, the loadmaster will distribute personal customs declarations (when not accomplished by passenger services) to all passengers, troops, and crewmembers. The loadmaster will also brief passengers and crewmembers on customs regulations, and prepare and compile necessary border clearance forms for the AC's signature.

6.46.2.2. Enroute, notify the C2 agency at the base of intended landing of any change in ETA to ensure that border clearance is accomplished as soon as possible after landing.

6.46.2.3. Obtain a permit to proceed when military necessities require that an aircraft, which has landed in the United States for customs clearance, to proceed to another base in the US to obtain border clearance. The permit to proceed delays customs inspection of cargo, passengers, and crew until arrival at the offload station, and saves intermediate offloading and reloading normally required for customs inspection. The permit to proceed is valid only to the airport of next landing where the border clearance must be completed or a new permit to proceed issued by a customs official. Do not make intermediate stops between the issue point of the permit to proceed and destination of manifested cargo unless required by an emergency situation or directed by the controlling C2 center.

6.46.2.4. When an aircraft lands for a US border clearance, a US Customs representative normally will meet the aircraft to obtain the required documents. Do not deplane passengers, troops, or crewmembers unless necessary for safety or the preservation of life and property (loadmaster excepted). Do not unload until approved by customs and agriculture personnel or their designated representatives. This procedure applies to the initial landing in the US and all landings required when operating on a permit to proceed or until all crew, passengers, and cargo complete final border clearance.

6.46.3. Inspections of US aircraft by foreign officials.

6.46.3.1. Follow US Air Force policy on status of military aircraft as stated in the FCG, *General Information* (Chapter 3). In substance, this policy holds that US military aircraft are immune from searches, seizures, and inspections (including customs and safety inspections) by foreign officials. In addition, ACs must be aware of and adhere to any specific FCG provisions for individual countries.

6.46.3.2. If confronted with a search request by foreign authorities, aircrews should use the following procedures.

6.46.3.2.1. In most cases, search attempts may be halted simply by a statement of the AC to the foreign official that the aircraft is a sovereign instrumentality not subject to search without consent of USAF headquarters or the US Department of State officials in the country concerned. This should be clearly conveyed in a polite manner so as not to offend foreign authorities that may honestly, but mistakenly, believe they have authority to search USAF aircraft.

6.46.3.2.2. If foreign authorities insist on conducting a search, the AC should make every effort to delay the search until he or she can contact USAF headquarters (through MAJCOM C2) or the appropriate embassy officials. The AC should then notify these agencies of foreign request by the most expeditious means available and follow their instructions.

6.46.3.2.3. If foreign officials refuse to desist in their search request, pending notification to USAF headquarters or the appropriate embassy, the AC should indicate that he or she would prefer to fly the aircraft elsewhere (provided fuel, flying time, and mechanical considerations permit a safe flight) and request permission to do so.

6.46.3.2.4. If permission is refused and the foreign authorities insist on forcing their way on board an aircraft, the AC should state that he protests the course of action being pursued and that he intends to notify both USAF headquarters and the appropriate American embassy of the foreign action. The AC should not attempt physical resistance, and should thereafter report the incident to USAF headquarters and appropriate embassy as soon as possible. The AC should escort foreign authorities if the inspection cannot be avoided.

6.46.3.3. Other procedures may apply when carrying sensitive cargo or equipment. Follow these procedures and applicable portions of classified FCG supplements.

6.46.4. Exercises and Contingency Operations.

6.46.4.1. General. Certain airlift missions, which do not transit normal ports of entry or exit, require special procedures to expedite compliance with customs, public health, immunization, and agricultural requirements. A joint memorandum of understanding, between these agencies and MAJCOM establishes certain procedures and waivers.

6.46.4.2. Implementation. Implementation of the agreement is not automatic. Traffic and border clearing agencies implement all or part of the agreement as necessary for each operation. Inspection and clearance may be accomplished at the US onload or offload base, or at the foreign onload or offload base.

6.46.4.3. Customs Procedures.

6.46.4.3.1. Outbound: No requirement. Filing of Customs Form 7507, **General Declaration (Outward/Inward**), is not required unless directed.

6.46.4.3.2. Inbound. Prepare one copy of the following documents before arrival:

6.46.4.3.2.1. Customs Form 7507 (Passenger list not required).

6.46.4.3.2.2. Cargo manifest.

6.46.4.3.2.3. For troops out of country less than 140 days:

6.46.4.3.2.3.1. Troop commander’s certificate for examination of troop baggage.

6.46.4.3.2.3.2. One copy of the US Customs Baggage Declaration Form for each passenger not under command of the troop commander, to include observers, support personnel, civilians, news reporters, and crewmembers.

6.46.4.3.2.3.3. Upon arrival at a CONUS offload base, a customs representative will meet the aircraft and accept the troop commander's certificate with respect to troop baggage. Individual baggage declarations are not required. The troop commander should have inspected troop baggage.

6.46.4.3.2.3.4. Troops will debark under the observation of the customs representative with only a spot check of articles and baggage. The customs officer may elect to make a more extensive inspection.

6.46.4.3.2.4. For troops who are out of the country 140-days, or more:

6.46.4.3.2.4.1. One copy of the US Customs Baggage Declaration Form for each passenger. This includes observers, support personnel, civilians, news media personnel, and crewmembers. Personnel may use DD Form 1854 or Customs Form 6059B.

6.46.4.3.2.4.2. Upon arrival at a CONUS offload base, a Customs representative will meet the aircraft and collect all declarations. Troops will debark under the observation of the customs representative who may make discretionary examination of the baggage.

6.46.4.4. Public Health Procedures.

6.46.4.4.1. When operating from a base without a traffic officer, the AC will ensure all crewmembers and passengers are properly immunized.

6.46.4.4.2. Spray the aircraft if required.

6.46.4.5. Immigration Procedures.

6.46.4.5.1. Outbound: No requirements.

6.46.4.5.2. Inbound: Submit the following to the immigration inspector if carrying civilian passengers.

6.46.4.5.2.1. One copy of Customs Form 7507.

6.46.4.5.2.2. One copy of Immigration Form I-92, **Aircraft/Vessel Report**.

6.46.4.5.2.3. One copy/set of Immigration Form I-94, **Arrival/Departure Record**, for each foreign national.

6.46.4.6. Agriculture Procedures:

6.46.4.6.1. Outbound: No requirement.

6.46.4.6.2. Inbound:

6.46.4.6.2.1. The command being airlifted will instruct troops that no fresh fruit, milk, milk products, vegetables, plants, plant pests, soil samples, animals, meat, and animal products can be brought into the United States. All items of troop personal gear are to be cleaned of mud before being brought aboard the aircraft. Personal gear and equipment must be examined for snails and other plant pests to prevent their accidental entry into the US.

6.46.4.6.2.2. Before loading, the command responsible for cargo being airlifted will clear vehicles and cargo of snails or other plant pests and of all mud and soil.

6.46.4.6.2.3. When required by agricultural quarantine regulations, the FCG, or higher headquarters, the aircraft will receive an aerosol treatment 30 minutes prior to landing.

6.46.4.6.2.4. On arrival, agricultural inspectors will inspect the aircraft after troops have disembarked. Crewmembers will assemble remains of in-flight lunches for prompt removal by fleet service personnel.

6.46.4.6.2.5. Inspectors examine baggage, equipment, vehicles, and cargo as offloaded. Any items, vehicles, or cargo found to be contaminated will be held for such treatment as the inspector may direct (washing, steam cleaning, physical cleaning, or fumigation).

6.46.5. Military Customs Pre-clearance Inspection Program. All crewmembers will ensure compliance with Military Customs Pre-clearance requirements.

6.46.6. Border Clearance Responsibility. The border clearance responsibility will be as designated by the base or area command in accordance with AFI 24-401, AFI 24-402, AFI 24-403, *Border Clearance, Customs Program, and other United States Entry Requirements and Related Areas*.

6.46.6.1. AC Responsibility. Where designated personnel are not assigned, border clearance is the responsibility of the AC. Many of the duties have been assigned to ground personnel and to the loadmaster, but the AC retains ultimate responsibility. When an aircraft is onloaded at a base without a border clearance function, the AC is responsible for the following:

6.46.6.1.1. Crewmembers, troops, and passengers possess current passports and valid visas if required.

6.46.6.1.2. Crewmembers, troops, and passengers have current certificates of immunization.

6.46.6.1.3. Cargo entry documents are in proper order.

6.46.6.1.4. Departing or entering the US through an air base where border clearance can be obtained.

6.46.6.1.5. Obtaining border clearance for aircraft cargo, passengers, crew, and baggage, if required, before takeoff to a foreign area, or after arrival from a foreign area.

6.46.6.1.6. Spraying the aircraft, if required.

6.47. Insect and Pest Control.

6.47.1. Responsibility. ACs will ensure required spraying is accomplished according to AFJI 48-104, *Medical and Agricultural Foreign and Domestic Quarantine Regulations for Vessels, Aircraft, and Other Transports of the Armed Forces (Joint)*, Department of Defense FCG, or as directed by higher headquarters. Certify the spraying on Customs Form 7507, or on forms provided by the country transited. Aircraft should never be sprayed with passengers on board. The only exception is when mandated by the FCG.

6.47.1.1. When spraying is required, use insecticide, aerosol d-phenothrin-2 percent, National Stock Number (NSN) 6840-01-067-6674 (or equivalent), to spray the aircraft. Wear leather or Nomex gloves while spraying.

6.47.1.1.1. Direct the nozzle toward the ceiling of the compartment or space being sprayed.

6.47.1.1.2. Spray spaces inaccessible from within the aircraft after completely loading fuel, baggage, cargo, and passengers, including baggage compartments, wheel wells, and other similar spaces.

6.47.1.1.3. Spray the cabin, cockpit, and other spaces accessible from within the aircraft after the crew is aboard and after closing all doors, windows, hatches, and ventilation openings.

CAUTION: If the insecticide label directs disembarkation after use, spray prior to boarding crew or passengers. Close all doors and hatches for 10-minutes after dispensing and ventilate for 15 minutes before allowing anyone on board.

6.47.1.2. Spray for 105 seconds unless longer periods are specified for the country being transited.

NOTE: Keep used aerosol cans separate from other trash so they may be disposed of safely.

6.47.2. Responsibility of AC In-flight. When seeing any insect or rodent infestation of the aircraft in-flight, notify the destination C2 center, base operations, or airport manager of the situation before landing so the proper authorities can meet the aircraft.

6.47.3. Procedure at Aerial Port of Disembarkation (APOD). On arrival at an APOD, do not open cargo doors or hatches except to enplane officials required to inspect the aircraft for insect or rodent infestation. Do not onload or offload cargo or passengers until the inspection is satisfactorily completed. This procedure may be altered to satisfy mission or local requirements, as arranged by the base air terminal manager or the local C2 organization.

Section 6G—Miscellaneous

6.48. Dropped Object Prevention. If an externally dropped object is discovered, the flight crew will:

6.48.1. Notify TACC or the controlling agency as soon as practical; include details of routing, altitude, weather, etc.

6.48.2. Notify maintenance at the first military station transited.

6.49. Cockpit Voice Recorder (CVR). If involved in a mishap or incident, after landing and terminating the emergency, pull the CVR power circuit breaker.

6.50. Life Support and Dash 21 Equipment Documentation. The AC or designated representative will:

6.50.1. Before departing home station or enroute stations, ensure appropriate serviceable protective clothing, life support, survival, and dash 21 equipment for the entire or remainder of the mission are aboard the aircraft.

6.50.2. Before departing home station and following enroute crew changes, review AF Form 4076, **Aircraft Dash 21 Equipment Inventory**, to ensure all required dash 21 equipment has been certified as installed by maintenance, the initial check has been signed by maintenance, and configuration documents match mission requirements.

6.50.3. Before departing home station and following enroute crew changes, review, sign, and date the AFTO Form 46, **Prepositioned Life Support Equipment**, to ensure all required protective clothing and life support and survival equipment have been certified as installed by aircrew life support and that configuration documents match mission requirements. Ensure appropriate number and type of life preservers are aboard for over-water missions carrying children and infants.

6.50.4. Missing Equipment. Aircrew members discovering equipment missing will accomplish the following:

6.50.4.1. Make an AFTO Form 781 entry for equipment found missing. Additionally, ensure equipment removed from the aircraft at an enroute station is documented in the AFTO Form 781.

6.50.4.2. Annotate AF Form 4076 and AFTO Form 46 in the next vacant column indicating the quantity remaining for the item. Ensure the ICAO location designator is entered above the check number of that column. Leave AF Form 4076 and AFTO Form 46 on board the aircraft in the event of an enroute crew change.

6.50.4.3. Advise the AC and determine whether the missing equipment should be recovered or replaced before mission continuation.

6.50.4.4. Assist, as required, in preparing reports of survey for missing equipment.

6.50.4.5. When possible, advise HQ AMC/DOTL (or MAJCOM life support office) and appropriate C2 agency (or airport management) before mission continuation.

6.50.5. Additional Equipment. If more equipment is discovered during the preflight than is annotated on the AF Form 4076 or AFTO Form 46, annotate the total quantity in the next vacant column for the item. Ensure the ICAO location designator is entered above the check number of that column.

6.51. No Show Passenger Baggage. No-show passenger baggage or baggage of passengers removed from flight will be downloaded prior to departure. See exception at paragraph **13.4.2.6.**.

6.52. Airfield Data Reports. Aircrews transiting strange airfields or airfields where conditions may adversely affect subsequent flight will:

6.52.1. Report airfield characteristics that produce illusions, such as runway length, width, slope, and lighting, as compared to standard runways, sloping approach terrain, runway contrast against surrounding terrain, haze, glare, etc.

6.52.2. Debrief the next C2 center transited.

6.53. Impoundment of Aircraft. If an aircraft is involved in a serious in-flight incident, the AC should impound the aircraft immediately after landing and contact the controlling C2 agency for further instructions.

6.54. Cockpit Congestion and Loose Objects.

6.54.1. The maximum number of persons on the flight deck will be the minimum commensurate with the mission requirements. At no time should this exceed seven (unless otherwise specified in a MAJCOM supplement.

6.54.2. No items (checklists, charts, etc.) will be placed behind the condition levers or on the throttle quadrant during critical phases of flight.

6.54.3. Place only soft items on the top bunk.

6.55. Wake Turbulence Avoidance. Comply with wake turbulence avoidance criteria. Acceptance of a visual or contact approach clearance or instructions to follow an aircraft is acknowledgment that the pilot will maintain a safe interval for wake turbulence avoidance.

6.56. Overflying Enroute Stops. The C2 agency may approve a request to overfly a scheduled enroute stop (ANG/DOD for ANG-directed missions, AFRC command center for AFRC-directed missions).

6.57. Ordnance Procedures. Conduct the following procedures after the live firing of chaff/flares or the crew suspects aircraft battle damage:

6.57.1. After landing, taxi to the de-arm area or another suitable safe location to check for hung ordnance.

6.57.2. The loadmaster or another qualified crewmember will deplane the aircraft and check all chaff/flare dispensers for hung ordnance or damage.

NOTE: ALE-40/47 flare squibs that fail to fire are not considered hung ordnance.

6.57.3. If hung ordnance is found, identified by a protruding or partially ejected flare cartridge, the aircraft will remain in a de-arm area until Explosive Ordnance Disposal (EOD) personnel meet the aircraft. The aircraft must remain in the designated safe area until EOD personnel can clear all hung ordnance.

6.57.4. If hung ordnance is not found, the aircraft can proceed to the parking location.

Chapter 7

AIRCRAFT SECURITY

7.1. General. This chapter provides guidance on aircraft security and preventing and resisting aircraft piracy (hijacking) of C-130 aircraft. AFI 13-207, *Preventing and Resisting Aircraft Piracy (Hijacking)*, AFI 31-101V1, *Air Force Physical Security Program*, and specific MAJCOM security publications contain additional guidance. Aircrews will not release information concerning hijacking attempts, or identify armed aircrew members or missions to the public.

7.2. Security. The C-130 is a priority "C" resource. Aircraft security at non-US military installations is the responsibility of the controlling agency.

7.3. Air Force Physical Security Program. The following security procedures will implement AFI 31-101, *The Air Force Physical Security Program*, requirements for C-130 aircraft:

7.3.1. The aircraft will be parked in an established restricted area and afforded protection via a roving patrol and a two-person armed response capability within 5-minutes.

7.3.2. When no permanent or established restricted area parking space is available, establish a temporary restricted area consisting of a raised rope barrier, and post with restricted area signs. Provide a one-person mobile patrol, supported by a two-person security response team capable of 5-minute response. Portable security lighting will be provided during the hours of darkness if sufficient permanent lighting is not available.

7.3.3. At non-US military installations, the AC determines the adequacy of local security capabilities to provide aircraft security commensurate with this chapter. If he or she determines security to be inadequate, the aircraft will depart to a station where adequate security is available.

7.3.4. The security force must be made aware of all visits to the aircraft.

7.3.5. Security support is a continual requirement and is not negated by the presence of aircrew or ground crewmembers. Security force support terminates only after the aircraft doors are closed and the aircraft taxies.

7.4. Enroute Security. The planning agency must coordinate with the execution agency to ensure adequate enroute security is available. The AC will receive a threat assessment and enroute security capability evaluation briefing for areas of intended operation prior to home station departure and should request updates from enroute C2 centers as required. If required, a security team will be assigned to the mission.

7.4.1. The PHOENIX RAVEN team will consist of two USAF security force members, but may include more depending on security requirements. See aircrew/team responsibilities at paragraph **7.14.**.

7.4.2. Arrival. On arrival, the AC will assess the local situation and take the following actions as required:

7.4.2.1. Area patrol. Request area security patrols from local security forces. If local authorities request payment for this service, use AF Form 15, **USAF Invoice**.

7.4.2.2. Aircrew surveillance. During short ground times, direct armed crewmembers to remain with the aircraft and maintain surveillance of aircraft entrances and activities in the aircraft vicinity.

7.4.2.3. Inadequate security. If in the AC's opinion, airfield security is inadequate and the safety of the aircraft is in question, the AC may waive the flight duty period limits and crew rest requirements and depart as soon as possible for a base with adequate security. Report movement and intentions to the controlling agency as soon as practical. If departure is not possible, the aircrew must secure the aircraft to the best of their ability. In no case, will the entire crew leave the aircraft unattended. Crew rest requirements will be subordinate to aircraft security when the airframe may be at risk. The AC should rotate a security detail among the crew to provide for both aircraft protection and crew rest until relief is available. Request security assistance from the nearest DoD installation, US Embassy, local military or law enforcement agencies as appropriate.

7.4.3. Entry Control Procedures. Unescorted entry is granted to aircrew members and support personnel assigned to the mission who possess their home station AF Form 1199, **USAF Restricted Area Badge**, supported by an Entry Access List (EAL) or aircrew orders. Aircrew members and assigned crew chiefs are authorized escort authority.

7.4.3.1. Normally, non-United States nationals such as cargo handlers can perform their duties under escort and should not be placed on the EAL.

7.4.3.2. Personnel not on the entry control list or aircrew orders must be escorted within the area.

7.5. Detecting Unauthorized Entry.

7.5.1. When parking on a secure ramp, the aircraft will normally be left unlocked/unsealed to allow ground personnel immediate access. If, in the AC's judgment, the aircraft needs to be locked and sealed in order to detect unauthorized entry, then:

7.5.1.1. Use available aircraft ground security locking devices.

7.5.1.2. Secure the doors in a manner that will indicate unauthorized entry (e.g., tape inside of doors to airframe so that entry pulls tape loose).

7.5.1.3. Close and seal the crew entrance door (box car seal).

7.5.1.4. Wipe the immediate area around lock and latches clean to aid in investigation of a forced entry.

7.5.1.5. Report any unauthorized entry or tampering to the OSI, security police or local authorities, and the C2 agency. Have aircraft thoroughly inspected prior to flight.

7.5.2. Security awareness is crucial to effective mission accomplishment. Aircrews must always remain vigilant to their surroundings, especially at high threat, low security locations. During preflight activities, aircrews will inspect accessible areas, to include aircraft wheel wells and avionics compartments for unauthorized packages, personnel, or other unfamiliar devices. Report any suspicious items to host security forces. Aircrews will maintain a heightened security posture throughout all pre-takeoff activities.

7.6. Preventing and Resisting Hijacking.

7.6.1. The Air Transportation Act of 1974 and the Federal Aviation Act of 1958, as amended, vest the FAA Administrator with exclusive responsibility for the direction of law enforcement activity in aircraft hijacking situations involving all aircraft (civil and military) in-flight in the United States.

7.6.2. In taking action during an aircraft hijacking situation, military forces will act under military command within the scope of their duties.

7.6.3. In the event an aircraft involved in an aircraft hijacking situation is carrying documents, equipment, or material that DoD has determined to be highly sensitive, or weapons of mass destruction, DoD will provide the FAA, and where appropriate, the FBI, with all pertinent information. Where possible, the FAA will consult and cooperate with DoD before directing any law enforcement activity.

7.6.4. An aircraft is most vulnerable to hijacking when the aircrew is aboard and the aircraft is operationally ready for flight.

7.6.5. A concerted effort must be made to prevent the hijacking of military or military contract aircraft by detecting potential hijackers before they board the aircraft.

7.6.6. Should preventive efforts fail, any actual attempt to hijack a military aircraft must be resisted in a manner appropriate to the situation.

7.6.7. Since air piracy may be committed by political terrorists or by individuals to whom the threat of death is a stimulus rather than a deterrent, ordinary law enforcement procedures may be ineffective. Thus, successful conclusion of a hijacking situation and apprehension of the hijackers may require use of specialized law enforcement techniques and procedures.

7.6.8. Delaying actions have been most successful in overcoming hijackings without loss of life or property.

7.6.9. In the case of an aircraft carrying passengers, the primary concern is the safety of the passengers.

7.6.10. Assistance to hijacked civil or military contract aircraft will be rendered as requested by the pilot in command of the aircraft and the authority exercising operational control of the anti-hijacking effort.

7.6.10.1. Responsibilities. When tasked for surveillance operations, the crew will:

7.6.10.1.1. Immediately after launch, establish radio contact with the C2 center via HF.

7.6.10.1.2. Rendezvous with the hijacked aircraft for surveillance as soon as possible after takeoff.

7.6.10.1.3. During rendezvous with the hijacked aircraft, assume a trail position out of cockpit and cabin view. Remain in an unobserved position unless otherwise directed. Safety is paramount; therefore, aircraft will maintain a 10NM trail in Canadian airspace and 5NM trail in all other airspace.

7.6.10.2. After direction to assume surveillance mission, continue until:

7.6.10.2.1. Fuel state dictates aborting to arrive at alternate with fuel reserves specified in this AFI.

7.6.10.2.2. Recalled by the C2 agency.

7.6.10.2.3. The hijacked aircraft's destination is determined to be a country requiring over flight clearance for the surveillance aircraft. Contact a C2 center or command post for further direction. Until directed to over-fly sovereign airspace, remain out of that country's territorial airspace as specified in the FCG.

7.7. Preventive Measures. Commanders at all levels must ensure preventive measures are taken to minimize access to the aircraft by potential hijackers. When a C-130 is operating away from home station, the AC will comply with this chapter and AFI 13-207, as supplemented.

7.7.1. Preventive measures include the following: The host station passenger processing or manifesting facility should conduct anti-hijacking inspections. Do not board passengers until the AC is fully satisfied with inspection results. In the absence of qualified passenger service representatives, the AC will ensure the anti-hijacking inspection of passengers and baggage is accomplished.

7.7.2. Medical facility commanders are responsible for anti-hijacking inspection of patients. When patients are delivered to the aircraft by civilian sources, the aircrew will perform required inspections prior to loading.

7.7.3. During exercises or contingencies in support of combat operations involving the movement of large groups of personnel, the unit being supported should manifest passengers and perform anti-hijacking inspections.

7.7.4. Passengers will not carry weapons or ammunition on their person or in hand-carried baggage aboard an aircraft except special agents, guards of the Secret Service or State Department, and other individuals specifically authorized to carry weapons.

7.7.4.1. Troops or deadhead crewmembers will not retain custody of ammunition on an aircraft. They will turn it in to the troop commander or AC. Troops may carry unloaded weapons and ammunition aboard the aircraft during combat operations. When the tactical situation dictates, weapons may be loaded at the order of the troop commander or team leader, after coordination with the AC.

7.7.4.2. Dummy clips that can be easily identified may be loaded for training at the order of the team leader after coordination with the AC.

7.7.5. If weapons must be cleared, ask the individual to:

7.7.5.1. Move to a safe, clear area at least 50-feet from any aircraft, equipment, or personnel before unholstering or unslinging their weapons.

7.7.5.2. Clear weapons in accordance with standard safety procedures.

7.8. Initial Response. When an act of air piracy involves an Air Force installation or aircraft within the United States, response will be according to the following guidelines until such time as FAA assumes active direction of anti-hijacking efforts. Resist all attempts to hijack a military aircraft. Resistance may vary from simple dissuasion, through deception and subterfuge, to direct physical confrontation, including the prudent use of weapons.

7.8.1. The following guidelines should be used to counter a hijacking, actual or threatened, while the aircraft is on the ground:

7.8.1.1. Delay movement of the aircraft to provide time for ground personnel and the aircrew to establish communication and execute coordinated resistance actions.

7.8.1.2. The authority for determining when ground resistance will be discontinued is vested in the highest available level of command. When adequate communication cannot be established, or when time does not permit, this authority is delegated in the following order:

7.8.1.2.1. MAJCOM commander exercising operational control of the aircraft.

7.8.1.2.2. MAJCOM commanders in whose area of responsibility (AOR) the airfield lies.

7.8.1.2.3. Senior operational commander on scene.

7.8.1.2.4. AC.

7.8.2. A hijacked aircraft carrying weapons of mass destruction will not be allowed to takeoff. Refer to DoD 5210.41M, paragraph 9B(3), for additional guidance.

7.9. In-flight Resistance. After airborne, success in thwarting a hijacking depends on the resourcefulness of the aircrew. Many variables of a hijacking preclude use of any specific counter-hijacking procedure. Some key factors should be evaluated before deciding a course of action to be taken, including the nature of the threat, danger to life or crippling damage to the aircraft in-flight, destination indicated by the hijacker, and the presence of sensitive material onboard. Some counter-hijacking actions the aircrew may consider are:

7.9.1. Engage the hijackers in conversation to calm him or her and to evaluate what course of action might be effective.

7.9.2. Dissuade the hijacker.

7.9.3. Use facts or subterfuge to convince the hijacker intermediate stops are necessary.

7.9.4. Propose more favorable alternatives, such as landing in a neutral, rather than a hostile, country.

7.9.5. Exploit any reasonable opportunity to incapacitate or overcome the hijacker physically, including the prudent use of firearms.

7.10. Communications between Aircrew and Ground Agencies. Crews facing a hijacking threat will notify ground agencies by any means available as soon as practical and follow-up with situation reports as circumstances permit.

7.10.1. If possible, transmit an in-the-clear notification of hijacking to ATC. Controllers will assign IFF code 7500 (does not preclude subsequent selection of code 7700).

7.10.2. If in-the-clear transmissions are not possible, report "am being hijacked" by setting transponder to code 7500. If unable to change transponder code, or when not under radar control, transmit a radio message to include the phrase "(call sign) transponder seven five zero zero."

7.10.3. Controllers will acknowledge receipt and understanding of transponder code 7500 by transmitting "(call sign) (facility name) verify squawking 7500." An affirmative reply or lack of reply from the pilot indicates confirmation and proper authorities are notified.

7.10.4. To report "situation appears desperate; want armed intervention," after code 7500 is used, change to code 7700. If unable to change transponder code to 7700, or when not under radar control, transmit "(aircraft call sign) transponder seven seven zero zero."

7.10.4.1. When changing from code 7500 to code 7700, remain on 7500 for at least 3 minutes or until a confirmation of code 7500 is received from ATC, whichever is sooner, before changing to code 7700. ATC acknowledges code 7700 by transmitting "(call sign) (facility name) now reading you on transponder seven seven zero zero."

7.10.4.2. Aircraft squawking 7700 after squawking 7500, which are not in radio contact with ATC, are considered by ATC to have an in-flight emergency (in addition to hijacking), and the appropriate emergency procedures are followed. Notification of authorities in this case includes information that the aircraft displayed the hijack code as well as the emergency code.

7.10.5. To report "situation still desperate, want armed intervention and aircraft immobilized", leave flaps full down after landing, or select landing flaps while on the ground. To facilitate message distribution, transmit "(aircraft call sign) flaps are full down."

7.10.6. To report "leave alone, do not intervene," retract the flaps after landing. Pilots who retract flaps after squawking 7700 should return to code 7500 and remain on code 7500 for the next leg of the hijacked flight unless the situation changes. Transmit "(call sign) back on seven five zero zero" to emphasize the fact intervention is no longer desired.

7.11. Forced Penetration of Unfriendly Airspace. These procedures are designed to deter possible hostile action against the hijacked aircraft that has been forced to penetrate airspace of a nation unfriendly to the United States.

7.11.1. If instructions from the unfriendly nation are received, either by radio contact or by air intercept before boundary crossing, comply with instructions received.

7.11.2. If no contact with unfriendly nation is made before approaching a boundary:

7.11.2.1. Maintain TAS not more than 400 knots.

7.11.2.2. Maintain an altitude between 10,000 and 25,000 feet if possible.

7.11.2.3. Fly a direct course toward destination announced by the hijacker, if no course is specified.

7.11.2.4. Transmit the international distress signal, MAYDAY, on any of the international distress frequencies (121.5 MHz, 243.0 MHz, or 2182 KHz) in an effort to establish communications.

7.11.2.5. Set mode 3, code 7700 on transponder.

7.11.2.6. If radio contact cannot be established, follow procedures set forth in FLIP.

7.11.3. Consider the presence of classified documents and equipment aboard the aircraft. When a landing in an unfriendly nation is imminent, attempt to dispose of or destroy the equipment or material.

7.12. Arming of Crewmembers. When crews are directed to carry weapons, at least one flight engineer (FE) and one loadmaster (LM) will carry weapons. All crewmembers should know who is armed. The following procedures apply when arming is directed:

7.12.1. Issue. Before departing home station, obtain weapons, ammunition, lock and key. Crewmembers will be armed according to AFI 31-207, *Arming and Use of Force by Air Force Personnel*, and MAJCOM publications. If an armed crew member must leave the crew enroute, transfer the weapon to another authorized crew member using AF Form 1297, **Temporary Issue Receipt**.

7.12.2. Wearing of Weapons. Wear weapons in a holster concealed at all times to prevent identifying armed crewmembers. Do not wear weapons off the flight line except to and from the C2 center, armories, and other facilities associated with aircrew activities.

7.12.3. Weapons Storage In-flight. Crewmembers will be armed before beginning preflight, on-load or off-load duties and until completion of all post-flight duties. When no passengers are aboard, weapons may be stored in the gun box in-flight after a satisfactory stowaway check. Crewmembers will rearm before landing. Weapons should not be unloaded before placing them in a gun box.

7.12.4. Weapons Storage during Crew Rest.

7.12.4.1. Aircrews, including stage crews, will store weapons and ammunition in the most secure facility available, normally the base armory.

7.12.4.2. If an armory is unavailable, non-stage aircrews may store weapons and ammunition in the aircraft gun box. If the aircraft is not equipped with a gun box, and a weapons storage facility is unavailable, leave the weapons in the most secure and least visible location on the aircraft. Attempt to seal the weapons with a box car seal and maintain the seal number. Lock and seal the aircraft doors.

7.12.5. Storing weapons in the gun box:

7.12.5.1. Weapons should normally not be unloaded.

7.12.5.2. Advise the C2 center as to which crew member has the gun box key.

7.12.6. Crewmembers will ensure they are reissued the same weapon until mission termination at home station.

7.12.7. Loading and Transfer of Weapons. Load and unload weapons at approved clearing barrels if available. Do not use a hand-to-hand transfer of loaded weapons to another crew member; place the weapon on a flat surface.

7.13. Force Protection. Crews must be alert to the possibility of terrorist activities at all times. The following considerations may help crewmembers avoid becoming victims of terrorism when operating in overseas locations:

7.13.1. Personal Conduct. Crews must realize their conduct can make them a target for individuals dissatisfied with US foreign involvement in their national affairs. Local foreign nationals may or may not condone a military presence - crew conduct will be watched and judged. Therefore, utilize the following:

7.13.1.1. Maintain good military bearing both on and off duty.

7.13.1.2. Avoid dressing in clothes that highlight the fact you are an American, i.e., cowboy hats, wide belt buckles, shirts with pro-American slogans, etc.

7.13.1.3. Do not wear clothing displaying profanity.

7.13.1.4. Know where “off-limits” areas are and avoid them.

7.13.1.5. Beware of personnel offering to take you on a “personal” sightseeing tour.

7.13.1.6. Do not get involved with anyone trying to involve you in games of chance.

7.13.1.7. When possible, always travel in groups of two or more.

7.13.1.8. Avoid demonstrations for any cause.

7.13.1.9. Avoid discussion of politics.

7.13.2. Ground Transportation Security. When traveling to and from billeting, messing facilities, etc., consider the following to minimize drawing attention to yourself as a potential target:

7.13.2.1. Select a plain car; minimize the “rich American” look.

7.13.2.2. If possible, consider not using a car that announces Government ownership.

7.13.2.3. Keep the gas tank at least half full at all times.

7.13.2.4. Do a thorough check of the car to look for signs of tampering - look at undercarriage and wheel-wells.

7.13.2.5. Park in well-lighted areas, preferably under US control.

7.13.2.6. Always lock your car. If possible, do not leave it on the street overnight.

7.13.2.7. Only leave the ignition key with parking attendants.

7.13.2.8. Before entering vehicles, check for suspicious objects. Look underneath vehicle seats.

7.13.2.9. Guard against establishing a routine. Vary times, routes, and modes of travel. Avoid late night travel.

7.13.2.10. Travel with companions or in convoys when possible.

7.13.2.11. Avoid isolated roads and dark alleys.

7.13.2.12. Ride with seat belts buckled, doors locked, and windows closed.

7.13.2.13. Do not allow the vehicle to be boxed in. Maintain enough interval between you and the vehicle in front so that you can pass.

7.13.2.14. Circle the block for confirmation of surveillance.

7.13.2.15. Do not stop or take other actions, which could lead, to a confrontation.

7.13.2.16. Recognize events that could signal the start of an attack, such as:

7.13.2.16.1. Cyclist falling in front of your car

7.13.2.16.2. Flagman or workman stopping your car.

7.13.2.16.3. Fake police or government checkpoints.

7.13.2.16.4. Disabled vehicle/accident victims on the road.

7.13.2.16.5. Unusual detours.

7.13.2.16.6. An accident in which your car is struck.

7.13.2.16.7. Cars or pedestrian traffic that box you in.

7.13.2.16.8. Sudden activity or gunfire.

7.13.2.17. Know what to do if you are under attack:

7.13.2.17.1. Consider sounding the horn.

7.13.2.17.2. Put another vehicle between you or your pursuer.

7.13.2.17.3. Execute an immediate turn and escape, jump curbs at a 30-45 degree angle, 35-mph minimum.

7.13.2.17.4. Ram a blocking vehicle only as a last resort.

7.13.2.17.5. Go to the closest safe haven.

7.13.2.17.6. Report the incident to security police.

7.13.3. Personal Identification. Consider the following actions to avoid advertising the fact you are an American:

7.13.3.1. Don't discuss our military affiliation with strangers.

7.13.3.2. Avoid military style luggage such as B-4 bags & duffel bags with military logos, etc.

7.13.3.3. Consider placing your official passport and related documents such as military ID, flight orders, club card, dog tags, billeting receipts in your hand-carried luggage and not in your wallet or purse.

7.13.3.4. Wear conservative styled civilian clothing when using commercial transportation.

7.13.3.5. Remember, the key is to maintain a low profile.

7.13.4. Hotel Security. When billeted in commercial hotels, crews need to be aware of the following:

7.13.4.1. If possible, obtain rooms between the second and sixth floors. These rooms are high enough to be less vulnerable to unauthorized entry from the outside and low enough to simplify evacuation if necessary.

7.13.4.2. Always lock interior locks when occupying rooms.

7.13.4.3. Always assume your room is monitored and avoid viewing or discussing classified material.

7.13.4.4. Avoid establishing a predictable routine (i.e., vary eating times and locations).

7.13.4.5. Avoid traveling on foot-use a vehicle (hotel shuttle, commercial taxi, etc.).

7.13.4.6. In high threat areas, stay off the streets (use hotel dining facilities if available).

7.14. PHOENIX RAVEN Security Team (RST). The RST supports mobility operations by providing security protection for aircraft transiting locations where a high threat, host, or en route security support may be marginal, unreliable, or nonexistent. A daily Threat Working Group (TWG) assesses security requirements for mobility missions and helps determine if a RST is required. When assigned PHOENIX RAVEN support, AC will:

7.14.1. Verify MAJCOM travel status on each RST's travel orders. MAJCOM will determine travel status (AMC and AMC-gained used Mission Essential Ground Personnel (MEGP) according to AMCI 11-208). The RST reports directly to the AC, when assigned.

7.14.2. Add RST members to the aircrews flight orders (see paragraph **3.4.**).

7.14.3. Be responsible for the RSTs welfare (transportation, lodging, etc.).

7.14.4. Ensure the RST receives an aircraft mission briefing, aircraft egress/passenger briefing (as appropriate).

7.15. Protecting Classified Material on Aircraft. The Aircraft Commander is responsible for protection of classified materials aboard their aircraft. See requirements in AFI 31-401, *Information Security Program Management*. As a minimum, ensure the IFF equipment is set to zero before leaving the aircraft.

Chapter 8

OPERATIONAL REPORTS AND FORMS

8.1. General. This chapter contains a description of applicable reports and forms. For assistance in completing safety forms contact the wing, unit, or local flight safety officer.

8.2. AF Form 457, USAF Hazard Report (AFI 91-202). AF hazard reporting system provides a means for Air Force personnel to alert supervisors and commanders to hazardous conditions requiring prompt corrective action. A hazard is any condition, act, or circumstance that jeopardizes or may jeopardize the health and well being of personnel, or which may result in loss, damage, or destruction of any weapons system, equipment, facility, or material resource.

8.3. AF Form 651, Hazardous Air Traffic Report (HATR). See AFI 91-202, Attachment 3, *Hazardous Air Traffic Report (HATR) Program (RSC HAF-SE (AR) 7602).*

8.3.1. The Air Force HATR program provides a means for personnel to report all near midair collisions (NMAC) and alleged hazardous air traffic conditions. Use information in HATR reports only for mishap prevention. AFI 91-202 list reportable incidents.

8.3.2. Procedures:

8.3.2.1. Make an airborne report of the hazardous condition to the nearest ATC agency (e.g. center, FSS, control tower, or aeronautical radio station), and give the following information as appropriate:

8.3.2.1.1. Identification or call sign

8.3.2.1.2. Time and place (radial/DME of NAVAID, position relative to the airfield, incident, etc.

8.3.2.1.3. Altitude or flight level

8.3.2.1.4. Description of the other aircraft or vehicle

8.3.2.1.5. Include a verbal statement as soon as possible after occurrence that a written HATR report will be filed upon landing

NOTE: ATC agencies (e.g., FAA, etc) must know if an official report is being filed.

8.3.2.2. File the HATR as soon as possible (24 hours) using any available means of communication. Normally, it should be filed at the Air Force base operations office at the landing airport. If this is impractical and if communications permit, notify the safety office of the Air Force base where the condition occurred, the safety office at the home base, or as prescribed by the overseas MAJCOM. In any case, provide the base or wing safety office with all available information needed to prepare AF Form 651. Turn in a completed copy of AF Form 651 to the wing safety office.

8.3.3. Individuals submitting a HATR are granted immunity from disciplinary action provided:

8.3.3.1. Their violation was not deliberate.

8.3.3.2. They committed no criminal offense.

8.3.3.3. No mishap occurred.

8.3.3.4. They properly reported the incident using procedures above.

NOTE: HATR reports are not privileged information and may be released outside the USAF.

8.4. AF Form 711, USAF Aircraft Mishap Report Worksheet (AFI 91-204).

8.4.1. Responsibilities. Notify the appropriate authorities of any mishap involving aircraft or crew. When notified, AMC units will initiate investigative and reporting actions in accordance with AFI 91-204, and OPREP-3.

NOTE: Do not attempt to classify a mishap.

8.4.2. Reportable Mishaps:

8.4.2.1. Report damage to the aircraft, or injury to the crew or passengers; also report any damage or injury to another organization's equipment or personnel resulting from the movements or actions of an aircraft or crew.

8.4.2.2. Report the following occurrences:

8.4.2.2.1. A physiological episode is a physiological reaction, near accident, or hazard in-flight due to medical or physiological reasons. This includes:

8.4.2.2.1.1. Proven or suspected cases of hypoxia.

8.4.2.2.1.2. Carbon monoxide poisoning or other toxic exposure.

8.4.2.2.1.3. Decompression sickness due to evolved gas (bends, chokes, neurocirculatory collapse), or severe reaction to trapped gas resulting in incapacitation.

8.4.2.2.1.4. Hyperventilation.

8.4.2.2.1.5. Spatial disorientation or distraction resulting in an unusual attitude.

8.4.2.2.1.6. Loss of consciousness from any cause.

8.4.2.2.1.7. Death by natural causes of any crewmember during flight.

8.4.2.2.1.8. Unintentional loss of pressurization if cabin altitude is above FL180, regardless of effects on personnel.

8.4.2.2.1.9. Alcohol and hangover (crew only).

8.4.2.2.1.10. Illness (both acute and pre-existing), including food poisoning, dehydration, myocardial infarction, seizure, and so forth.

8.4.2.2.1.11. Exposure to toxic, noxious, or irritating materials such as smoke, fumes, or liquids.

NOTE: In the event of a physiological episode, all crewmembers and passengers involved will report to a flight surgeon as soon as practical and request that an AF Form 711GA, **Life Sciences Report of an Individual Involved in an AF Accident/Incident,** Section A, Aircraft Accident/Incident, be accomplished.

8.4.2.2.2. In-flight flameout, engine failure, required engine shutdown, suspected engine power loss, or loss of thrust sufficient to preclude maintaining level flight above MEA.

NOTE: Intentional shutdowns for training and FCF are excluded; however, report failure to restart, using the criteria above.

8.4.2.2.3. Unselected propeller reversal.

8.4.2.2.4. Flight control malfunction resulting in an unexpected or hazardous change of flight attitude, altitude, or heading.

8.4.2.2.5. Malfunction of landing gear when difficulty is experienced using emergency system or procedures.

8.4.2.2.6. In-flight loss of all pitot-static instrument indications or all gyrostabilized attitude or directional indications.

8.4.2.2.7. Spillage or leakage of radioactive, toxic, corrosive, or flammable material from aircraft stores or cargo.

8.4.2.2.8. All cases of departure from intended takeoff or landing surface onto adjacent surfaces.

8.4.2.2.9. Any incident which does not meet the established criteria for a reportable mishap but, in the judgment of the AC, needs to be emphasized in the interest of flight safety.

8.5. Reports of Violations/Unusual Events or Circumstances. Violations identified in AFI 11-202V3 and include navigation errors (including over-water position errors exceeding 24NMs, border and ATC violations) will be reported.

8.5.1. Include the following; factual circumstances, investigation and analysis, findings and conclusions, recommendations, and actions taken.

8.5.1.1. Attachments should include; notification of incident, Crew orders, statement of crewmembers (if applicable), and documenting evidence (logs, charts, etc.).

8.5.2. In addition to the information listed, the historical flight plan will be downloaded onto a floppy disk and turned in to the C2 center or owning standardization and evaluation office.

8.5.3. Send the original investigation report within 45 days to the appropriate MAJCOM. ANG/AFRC units receiving alleged violations will send the original investigation through channels to arrive at HQ AFRC/IGI within 35 days. HQ AFRC/IGI will send the investigation report to the MAJCOM within 45 days.

8.5.4. The following OPREP-3 reporting procedures for all aircraft notified of navigational errors exceeding 24 NMs will be reported under AFMAN 10-206, *Operational Reporting*.

8.5.4.1. On notification of a navigational position error, the AC (or agency receiving notification) documents the circumstances surrounding the incident (report content below) and ensures submission of an OPREP-3 report through C2 channels.

8.5.4.2. Include the following;

8.5.4.2.1. Report content include: name and location of unit submitting report, mission identification number, reference to related OPREPs-3, type of event (e.g., state "navigation position error."), date, time (zulu), and location (e.g., ARTCC area).

8.5.4.2.2. Description of facts and circumstances. Include aircraft type and tail number, unit (wing or squadron assignment of crew), home base, route of flight, point of alleged deviation, and miles off course.

8.5.5. ACs must keep appropriate MAJCOM agencies apprised of any unusual events or circumstances impacting their missions. Examples of reportable events include meaconing, jamming, intrusion, interception, fuel dumping, loss of multiple engines, hostile fire, injury to passengers or crewmembers, etc. This list is not exhaustive. Some events may require the C2 agency to forward OPREP reports to higher headquarters. The old adage, "when in doubt, report it," applies.

8.6. Petroleum, Oil, and Lubricants (POL) - Aviation Fuels Documentation. Several different forms are used to record aviation fuels transactions. The form used to record the transaction depends on who and where the actual refueling takes place. Basically, these transactions can be broken down into two categories: refueling at USAF locations and refueling at other than USAF bases:

8.6.1. Refueling at USAF Locations. AF Form 1994, **Fuels Issue/De fuel Document**, is used to record the Aviation Fuels Transaction (issue or defuel) at USAF locations.

8.6.2. Refueling at locations other than USAF bases:

8.6.2.1. DD Form 1898, **AVFuels Into-Plane Sales Slip.** This form is used to record the aviation fuels transaction (issue or defuel) at other DOD locations (USA, USN, and USMC) and at commercial airports where into-plane contracts are in force.

8.6.2.2. AF Form 315, **United States Air Force AVFuels Invoice.** This form is used to purchase aviation fuels and oils at commercial locations where into-plane contracts are not in force. The form is filled-in by the AC or his authorized representative and is described in AFI 23-206. If the vendor wants to be paid without submitting an invoice, the AC retains the original AF Form 315 to return to home station for accounting and finance processing. Provide two legible copies of the form to the vendor. If the vendor wants to submit an invoice for payment, give the vendor the original AF Form 315 to attach to the invoice.

NOTE: Aviation Into-Plane Reimbursement (AIR) Card. The AIRcard is a commercial credit card, which allows aircrews to purchase aviation fuel, fuel related supplies, and/or ground services at commercial airports where no DoD/Canadian into-plane contracts exist. Accepted at over 4200 locations, it is intended to replace the AF Form 315, United States AVFuels Invoice and AF Form 15, United States Air Force Invoice, at locations that accept the AIRcard. All Air Force aircraft will be issued an AIRcard. Additional information at SF WEB page: (WWW.KELLY.AF.MIL/SFWEB/AIRCARD.HTM).

8.7. AF Form 15, United States Air Force Invoice. Used to purchase ground fuels, oils, or services at non-DoD activities, see AFI 23-202. When completed, log and place inside AF Form 664, **Aircraft Fuels Documentation Log**.

8.7.1. Use the AF Form 15 for vendor services/supplies only if contract vendors are not available or the contract vendor will not accept the aircraft identaplate.

8.7.2. If the vendors require a signature on their form and an AF Form 15 has been used, write the statement "AF Form 15 Executed" on the vendor's form.

8.7.3. Return two copies of the AF Form 15 to the operations officer at home station.

8.7.4. Purchases at Canadian into-plane locations will be documented using the local vendor's invoice. AF Form 15 or 315 will not be accomplished. Hand scribe the information from the aircraft identiplate to the vendor's invoice, and complete a separate sheet with the information listed on the Aviation Issues to DoD and Non-DoD, Aircraft Refueling Tender Sheet (See AFI 23-202). Log and place a copy inside the AF Form 664, **Aircraft Fuels Documentation Log**.

8.7.5. Purchases at SITCO Agreement locations require presenting the aircraft identiplate. The invoice must include the date of transaction, grade of the product, quantity issued or defueled, unit of measure, and signature of the Air Force representative. If the vendor also requires completion of an AF Form 15 or 315 in addition to their invoice, annotate on the vendor's invoice "AF FORMS EXECUTED." Log and place the documentation inside the AF Form 664, **Aircraft Fuels Documentation Log**.

8.7.6. Purchases at non-contract commercial airfields are accomplished using the AF Form 15 or 315. See AFI 23-202 for instructions on completing these forms.

8.7.7. Purchases at foreign military airfields, including replacement-in-kind (RIK) locations, the host country forms are used to record the purchase. Information from aircraft identiplate should be hand scribed on the local form. Log and place a copy inside AF Form 664.

8.8. AMC Form 54, Aircraft Commander's Report on Services/Facilities. This is an instrument for ACs to report that services rendered or conditions encountered were unsatisfactory or detrimental to efficient mobility operation, or services rendered or procedures used are worth adopting for all organizations, or a performance rendered by a person (or persons) was commendable and deserves recognition. Attempt to solve problems at the lowest level or by contacting the senior MAJCOM representative. If further action is deemed necessary or the problem requires increased visibility, complete an AMC Form 54.

8.8.1. Submit AMC Form 54 to the originator's squadron commander. Time permitting, leave an information copy with the CP or senior AMC representative on station. Forward an information copy to HQ AMC/DOV and AMC NAF/DO. Process IAW AMCI 11-208.

8.9. AMC Form 196, Aircraft Commander's Report on Crew Member. The AC may prepare an AMC Form 196 on each crewmember whose performance was outstanding, below average, or unsatisfactory during a mission.

8.10. AMC Form 43, Transient Aircrew Facilities Report. Crewmembers may submit reports whenever they encounter unsatisfactory conditions or have suggestions for improvements of transient facilities. This report may be submitted by any crewmember whether or not an unsatisfactory item is included in the AC's trip report. Complete AMC Form 43 and send to HQ AMC/MWPS, or MAJCOM equivalent.

8.11. Airdrop Incident Malfunction Reporting. Airdrop malfunctions are reported and investigated in accordance with AFJI 13-210. Complete the DD Form 1748-2, **Airdrop Malfunction Report (Personnel-Cargo)** for any airdrop malfunction. Report any off-DZ drops or extractions immediately to the controlling agency and to proper safety channels.

8.12. AMC Form 423, Reporting Meaconing, Intrusion, Jamming, and Interference (MIJI) of Electromagnetic Systems. Use this form as part of a DOD program to identify, analyze, and disseminate information concerning MIJI incidents.

Chapter 9

TRAINING POLICY

9.1. Crew Complement and Scheduling.

9.1.1. Crew Qualification. Crew must be current and qualified. If noncurrent or unqualified, crew position must include an instructor or flight examiner.

9.1.2. Initial Training Flights. Fly initial training missions during daylight VMC unless unacceptable training delays result.

9.1.3. Training Aircraft Not Capable of Flight (Not applicable to AFRC and ANG). If an aircraft is not capable of departure within four hours after scheduled departure time, cancel the training mission. The unit commander or operations officer may grant exceptions with the concurrence of the pilot in command. Provide a planned minimum of 1 ½-hours for aircraft preflight duties before the end of the 4-hours.

9.2. Pilot Qualification Training. Pilot mission qualification training and Joint Airborne/Air Transportability Training (JA/ATT) may be conducted on missions with passengers onboard only if the individual in training is qualified (completed aircraft checkride with a valid AF Form 8, **Certificate of Aircrew Qualification**) for the seat position occupied.

9.2.1. Do not perform simulated emergencies, touch-and-go landings, or stop-and-go landings when passengers are on board.

9.2.2. Maintenance and civilian employees under direct contract to the DoD, engaged in official direct mission support activities, are considered mission essential and may be onboard when touch-and-go or stop-and-go landings are performed.

9.2.3. Maneuvers restricted to the formal training unit (FTU) can also be accomplished by units using the secondary method of formal training.

9.3. Flight Maneuvers. The maneuvers listed are authorized for qualification and continuation training (or formal upgrade training where indicated). Maneuvers restricted to FTUs will only be performed during formal training under direct IP supervision. They are applicable to all C-130 aircraft except when prohibited or restricted by the flight manual or other current directives. The pilot or IP will alert all crewmembers before accomplishing the following:

9.3.1. Approach to Stalls: Direct IP supervision required. Authorized during formal upgrade training in day VMC at a minimum of 5,000 feet above the ground or cloud deck.

9.3.2. Instrument Steep Turns: Authorized during daylight VMC with up to 60-degrees bank. Restricted to above 5,000 feet AGL (or 5,000 feet above a cloud deck) for bank angles in excess of 45-degrees. Check stall speed prior to making instrument steep turns.

9.3.3. Ground-Idle Touch-and-Go Landings: Authorized during formal upgrade training. Do not perform no-flap ground-idle touch-and-go landings.

9.3.4. Slow Flight: Direct IP supervision required. Authorized at or above 5000 feet AGL. Fly at approach, threshold, and 1.2 power off stall speed with gear down and flaps 0%, 50%, or 100%. Do not exceed 15-degrees of bank.

9.4. Touch and Go Landing Limitations.

9.4.1. An in-flight evaluation and SQ/CC certification will be accomplished prior to an AC accomplishing touch-and-goes without direct IP supervision. The evaluation should occur in conjunction with the initial qualification evaluation. After successful evaluation, ACs must be evaluated on recurring evaluations to maintain touch and go qualification.

9.4.2. AC touch and go certification.

9.4.2.1. ACs must have accumulated a minimum of 100 hours (not including other time) since AC certification prior to touch and go certification.

9.4.2.2. Separate Sq./CC certifications are required for ACs to:

9.4.2.2.1. Accomplish their own flight idle touch-and-go landings.

9.4.2.2.2. Supervise other pilot’s flight idle touch-and-go landings.

NOTE: Training for both phases of certification may be accomplished on the same sortie.

9.4.2.3. Unless otherwise specified in a MAJCOM supplement to AFI 11-202V2, place a letter of certification by the Sq./CC in the FEF and make an entry on the AF Form 1381, **USAF Certificate of Aircrew Training**.

9.4.3. Ground and flight idle touch and go landings may be performed by any pilot from either seat, when a flight examiner pilot, instructor pilot, or an instructor pilot candidate during upgrade training/evaluation occupies a pilot's seat.

9.4.4. Touch and go landings are authorized under the following conditions:

9.4.4.1. Minimum runway length for 50% flap flight idle touch-and-go landings is 5,000 feet. Minimum runway length for all other touch and go landings is 6,000 feet.

9.4.4.2. Authorized when crosswind component corrected for RCR is within the recommended zone of the landing crosswind chart.

9.4.4.3. Minimum ceiling of 1000 feet and minimum visibility of 2-miles (300 feet and RVR 40 (3/4 SM visibility) for IPs).

9.4.4.4. Authorized when normal wake turbulence criterion is met.

9.4.5. Include type of touch and go as part of the briefing, (i.e., ground-idle or flight-idle). Do not perform a no-flap ground-idle touch-and-go landing.

9.4.6. Touch-and-go landings may be performed with MAJCOM approved maintenance personnel on board provided the mission is a designated training flight and an instructor or evaluator pilot is in command, and the personnel are necessary for maintenance evaluations or inspections. Touch-and-go landings are not authorized with other passengers onboard.

9.5. Simulated Emergency Flight Operations.

9.5.1. Practice emergencies, that require simulating an engine shutdown, placing switches in other than their normal position, or an abnormal configuration, only during training, evaluation, or currency flights when an instructor or flight examiner pilot is in one of the pilot seats. Preface all simulated emergencies with the word "simulated" and terminate simulated emergencies when an actual emergency arises. Do not conduct aircraft systems emergency procedures training during any tactical training. Copilots designated as AC candidates may perform any maneuver authorized for an AC (when in the left seat) under the direct supervision of an IP (comply with paragraph **3.1.1.1.**). Copilots having attained 500 PAA flying hours may conduct 3-engine approaches, missed approaches, and landings with squadron commander approval and when under the direct supervision of an instructor pilot. Unless otherwise specified in a MAJCOM supplement to AFI 11-202V2, place a letter of certification by the Sq./CC in the FEF and make an entry on the AF Form 1381. IP candidates who occupy a pilot seat and are under the supervision of a flight examiner pilot not in a pilot seat may practice simulated emergency procedures during initial or requalification upgrade evaluations to instructor pilot. This applies to all maneuvers in **Table 9.1.** unless otherwise specified in the restrictions.

9.5.1.1. Simulated Engine Failure. Direct IP supervision required except for IP candidates under the supervision of flight examiner during initial or requalification upgrade evaluations to IP. One throttle may be retarded to FLIGHT IDLE at not less than VMCA (one-engine inoperative, out of ground effect) nor less than 300 feet AGL.

9.5.1.2. Weather. Simulated engine failure is authorized in daylight IMC if the weather is at or above circling minimums and at night with weather at or above 1,000-foot ceiling and 2SM visibility or circling minimums whichever is higher. Crosswind component must be within the recommended zone of the landing crosswind chart.

9.5.1.3. Restrictions:

9.5.1.3.1. Engine out no-flap landings are restricted to ACs upgrades and above.

9.5.1.3.2. Planned go-around from simulated engine-out no-flap approaches are not authorized.

9.5.1.3.3. Required go-around from engine out no-flap approaches require setting the flaps to 50% and using all four engines.

9.5.1.3.4. Do not compound engine out circling approaches with any other simulated malfunctions.

9.6. Operating Limitations.

9.6.1. Policy: Unless specifically authorized elsewhere, do not practice emergency procedures that degrade aircraft performance or flight control capabilities.

9.6.1.1. In an actual emergency, terminate all training and flight maneuvers practice.

9.6.2. Low/Missed Approaches. Initiate a planned missed approach no lower than:

9.6.2.1. Precision approach - DH (or 200-feet HAT, whichever is higher).

9.6.2.2. Non-precision approach - Minimum altitude depicted on approach plate.

9.6.2.3. Visual Approach - 200-feet AGL for simulated emergencies (no minimum for non-emergency).

9.6.2.4. Restricted Low Approach (aircraft, equipment, or personnel are on the runway) - 500-feet AGL.

9.7. Landing Limitations.

9.7.1. No-Flap Landing Limitations:

9.7.1.1. Direct IP supervision required.

9.7.1.2. Authorized for certified copilots with 500 PAA hours, AC candidates, ACs and above.

9.7.1.3. No-flap circling approaches authorized for AC upgrades and above.

9.7.1.4. Engine out no-flap approaches authorized for ACs and above.

9.7.1.5. Do not combine no-flap circling approaches with any other simulated emergencies.

9.7.1.6. Maximum gross weight is 120,000 lbs.

9.7.1.7. Crosswind component must be within the recommended range on the crosswind chart.

9.7.1.8. Authorized in daylight IMC if the weather is at or above circling minimums and at night with weather at or above 1000 foot ceiling and 2 SM visibility or circling minimums whichever is higher.

9.7.1.9. Use 50% flaps for a go-around.

NOTE: Check no-flap landing distance with runway available.

9.7.2. Stop-and-Go Landing Criteria:

9.7.2.1. Authorized only on designated training, evaluation, or currency missions.

9.7.2.2. Authorized to be performed by any C-130 qualified pilot.

9.7.2.3. Runway remaining for takeoff must be sufficient to allow takeoff and refusal speeds to be equal.

9.7.2.4. Crosswind component corrected for RCR must be in the recommended zone of the landing crosswind chart.

9.7.2.5. Ceiling and visibility must be at least 300 feet and 3/4 mile (RVR 40).

9.7.3. Do not perform Stop-and-Go landings:

9.7.3.1. In conjunction with no-flap landings.

9.7.3.2. When normal wake turbulence criterion is not met.

9.7.3.3. When intercepting or crossing the flight path of a wide-bodied aircraft while performing an approach or landing.

9.8. Prohibited In-flight Maneuvers. The following maneuvers will not be practiced or demonstrated in-flight:

9.8.1. Full stalls.

9.8.2. Rudder force reversals.

9.8.3. Spins.

9.8.4. Simulated runaway trim malfunctions.

9.8.5. Simulated hydraulic system loss by turning engine driven hydraulic pumps off.

9.8.6. Simulated two-engine approaches or landings.

9.8.7. Simulated engine-out takeoffs.

9.9. Training/Evaluation Briefings. Before all training/evaluation missions, ACs or instructors/flight examiners will brief their crews on the following additional items:

9.9.1. Training/Evaluation requirements. Instructors/evaluators (for each crew position) will outline requirements and objectives for each student or examinee.

9.9.2. Planned training profiles and seat changes.

9.10. Debriefing. Review and evaluate overall training performed. Each student or aircrew member should understand thoroughly what training has been accomplished. Ensure all training is documented.

9.11. Simulated Instrument Flight. Do not use a hood or other artificial vision restricting device for any phase of flight. Simulated instrument flight may be flown and logged without use of a vision restricting device.

9.12. Actual Engine Shutdown and Airstart. Direct IP supervision required. One engine may be shutdown at not lower than 2,500 feet AGL in daylight VMC.

9.13. Windmill Taxi Start. Direct IP supervision required. Authorized during daylight. Crosswind component must be within the recommended zone of the flight manual takeoff crosswind chart. Runway must be dry, hard-surfaced, and at least 147 feet wide. Dash one recommendations are mandatory. Requires OG/CC approval when performed at units other than the Formal Training Unit (FTU).

9.14. Aborted Normal Takeoff. Direct IP supervision required. Authorized during formal upgrade training in daylight. Crosswind component must be within the recommended zone of the takeoff crosswind chart. Runway must be dry, hard-surfaced, and long enough to allow refusal and takeoff speeds to be equal. Initiate the abort by stating "REJECT" before refusal speed. Do not practice aborts from touch-and-go or stop-and-go landings. Prebrief all actual engine shutdowns due to a simulated malfunction. Requires OG/CC approval.

9.15. Aborted Maximum Effort Takeoff. Direct IP supervision required. Authorized for AC upgrades and above during formal upgrade training. Restricted to the main runway during daylight. Crosswind component must be within the recommended zone of the takeoff crosswind chart. Runway must be dry, hard-surfaced, 147 feet wide and long enough to allow refusal and takeoff speeds to be equal. Simulate a runway length less than CFL. Initiate the abort by stating "REJECT" at or below a refusal speed based on simulated runway length. Compare distance traveled to runway length and point out the ramifications of operating with less than critical field length. Cool brakes between aborted takeoffs. Do not shut down an engine due to simulated malfunctions. Do not practice aborted max effort takeoffs from stop-and-go landings. Requires OG/CC approval.

9.16. Maximum Effort Takeoff. ACs may accomplish maximum effort takeoffs. Maximum effort takeoffs should be performed from the main runway when it is available (i.e., safe and practical to taxi from an assault landing zone). Takeoffs from the assault zone are authorized during formal mission qualification training or when approved by the OG/CC for currency or proficiency.

Table 9.1. Training Restriction Summary.

Simulated Engine Failure	Certified 500 PAA hour copilot or above with direct IP supervision. Prohibited during tactical operations. Retard one throttle to flight idle at not less than VMCA (one-engine inoperative, out of ground effect) nor less than 300 feet AGL. Authorized day IMC if WX at or above circling minimums or night if weather is at or above 1,000 foot ceiling and 2 SM visibility. Crosswind component must be in the recommended zone. Engine out no flap landings are restricted to ACs and above, and planned go-around are not authorized. Engine out circling approaches will not be compounded with any other simulated malfunctions.
No-Flap Landing	Authorized for certified copilots with 500 PAA hours, AC candidates, ACs and above. Simulated engine-out no-flap approaches authorized for ACs and above. No-flap circling approaches will not be combined with any other simulated emergencies. Max gross weight is 120,000 lbs. and crosswind component must be within the recommended range. Authorized in day IMC if WX is at or above circling minimums, and at night with WX of 1,000 foot ceilings and 2 SM visibility or circling minimum, whichever is higher.
Touch-and-Go Landings	Requires flight evaluation, certification and minimum 100 hours as pilot-in-command. ACs restricted to flight idle touch and go landings. Ground and idle performed by any pilot from any seat when a flight evaluator, IP, or IP candidate during upgrade/evaluation occupies a pilot's seat. No-flap ground idle touch and go landings not authorized Minimum runway length: flaps 50 percent, 5,000 feet - for all other, 6,000 feet. Crosswind component corrected for RCR is within recommended zone. Minimum ceiling of 1,000 ft and minimum visibility of 2SM (300-ft and RVR 40 (3/4 SM visibility) if an IP is in either seat)
Stop-and -Go Landings	Authorized only on designated training, evaluation, or currency missions. Authorized to be performed by any C-130 qualified pilot. Runway remaining for takeoff must be sufficient to allow takeoff and refusal speeds to be equal. Crosswind component corrected for RCR must be in the recommended zone of the landing crosswind chart. Ceiling and visibility must be at least 300-feet and 3/4 mile (RVR 40).
Go-around, Missed Approaches	Minimum altitude is 500-feet AGL when aircraft, equipment, or personnel are on the runway. VFR - No lower than 200-feet AGL when practicing simulated emergencies. Practice instrument approaches - no lower than minimum altitude for the approach.

Slow Flight Demonstration	At or above 5,000 feet AGL. Fly at approach, threshold, and 1.2 times stall speed with gear down and flaps 0, 50, or 100 percent Do not exceed 15-degrees of bank
Approach to Stalls	Authorized during formal upgrade training. Requires day VMC at a minimum of 5,000 feet AGL or above cloud deck.
Steep Turns **(not applicable to tactical maneuvers)**	Authorized during day VMC with up to 60-degrees bank. Restricted to at or above 5,000 feet for bank angles in excess of 45-degrees. Review stall speeds before performing turns.

Chapter 10

LOCAL OPERATING PROCEDURES

10.1. General. Units define local operations procedures in this chapter.

Chapter 11

NAVIGATOR PROCEDURES AND FORMS

11.1. General:

11.1.1. This chapter contains C-130 navigation procedures and forms. Publish local procedures, associated correction graphs, and figures in the unit supplement to **Chapter 10**.

11.1.2. General instructions for completion of AF Form 4116, **C-130 Flight Plan and Record**, are provided in this chapter. MAJCOM-approved computer flight plans may be used as a substitute for AF Form 4116.

11.1.3. Navigators may use hand-held calculators or computers to assist in navigation. Local units may restrict or standardize at their discretion.

11.2. Mission Planning Procedures.

11.2.1. The AC and navigator will jointly verify routing, altitude, and fuel load prior to departure. Use the chart updating manual to CHUM within 10-NM of the approach and departure base for airfields without a DOD or Jeppesen approved approach plate. A copy of the navigator's flight plan will be provided to the copilot to verify routing and aid in position reporting. Navigator crew changes (engine running offload or augmented crews) will include, as a minimum, a briefing on equipment status.

11.2.2. When practical, plan the most direct routing possible or utilize wind optimized CFP routing to enhance fuel conservation.

11.2.3. A MAJCOM-approved CFP, AF Form 70, or AF Form 4116 is required for all flights except local area training flights with an established standard procedure.

11.2.4. A fuel plan is required for all flights except local area training flights with established standard ramp fuel loads.

11.2.5. The navigator will sign in the indicated block on page 1 of the AF Form 4116 to certify accuracy of all entries. Any entries not required for a particular mission on the AF Form 4116 may be left blank.

11.3. Flight Planning.

11.3.1. Most entries on the AF Form 4116 are self-explanatory or explained below.

11.3.1.1. HIGHEST ACC FL - Highest Acceptable Flight Level. This altitude is obtained from the appropriate aircraft performance or fuel planning publication.

11.3.1.2. WPT - Waypoint. Use this column to indicate the number of each waypoint as entered in the aircraft computer.

11.3.1.3. A/B - Ahead or Behind. Compare estimated time of arrival (ETA) based on the original flight plan to actual time of arrival (ATA) at each waypoint. Record the difference in this column. If the flight plan changes in-flight, non-applicable ATA spaces may be left blank.

11.3.2. When an alternate destination is required, use a flight planning line to indicate, as a minimum, the name of the alternate and the time, course, and distance to the alternate.

11.3.3. Aircrews may utilize ACFP, PFPS or any other MAJCOM approved flight planning program.

11.4. Not Used.

11.5. Equal Time Point (ETP) Computations.

11.5.1. Use the worksheet on the AF Form 4116, page 1, to calculate the time to ETP.

11.5.2. Recompute ETP in-flight when the actual time of arrival at a reporting point is 15 minutes or more ahead or behind the planned time if the change was caused by erroneous wind information.

11.5.3. ETP Computations (See **Figure 11.1.**). Computations are required on Category I routes or Category I portions of routes when the total time between the last suitable airfield (LSAF) and the first suitable airfield (FSAF) is 5-hours or more.

11.6. Flight Charts.

11.6.1. Show the following items on the chart:

11.6.1.1. Navigator's name and coordinated universal date. Chart number and edition will be annotated on a stripped chart.

11.6.1.2. Flight plan course line and waypoints (if not pre-labeled) will be annotated with waypoint number, identifier, radial and DME, or latitude and longitude.

11.6.1.3. Annotate suitable emergency airfields. Optimum emergency airfields are located within 50 NM of the intended route. Refer to the Airfield Suitability and Restrictions Report (ASRR) for suitability.

11.6.1.4. Portions of Air Defense Identification Zones (ADIZ)/Flight Information Regions (FIR) boundaries (if not depicted accurately) pertinent to the route will be annotated.

11.6.1.5. Annotate the approximate location of the ETP.

11.6.2. Plot each fix or position along with the time at that position. Use standard symbols from AFPAM 11-216.

11.6.3. In the interest of conservation, flight charts for high level missions may be reused whenever such reuse would not affect plotting accuracy of fixes or position determination.

11.7. In-flight Procedures.

11.7.1. The navigator will monitor the primary command radio unless directed to do otherwise. The navigator will record air traffic control (ATC) clearances and monitor the read back. This will normally include all ATC instructions involving departure, enroute, and approach procedures. This procedure is not applicable when ATC instructions require immediate execution by the pilot, or when such action interferes with the timely performance of other time-sensitive navigator duties.

11.7.2. On approach or departure, the navigator will monitor the aircraft position using an ONC, TPC, or JOG chart. In IMC or at night the navigator will use all available navigational aids (including aircraft radar) to keep the aircraft clear of all obstructions.

11.7.3. The navigator will flight follow on all missions using a suitable plotting charts (JNC, JNCA, or GNC).

11.7.4. On all flights, except tactical or pilot proficiency flights, compute a TAS check according to paragraph **11.11.**

11.7.5. On Category I routes or route segments, maintain a flight log. Time between fix/MPP entries will not exceed 1 hour.

NOTE: Malfunctions or loss of navigational capability, which degrade course centerline accuracy, will be reported immediately to ATC.

11.7.6. On Category I routes, when the time between the LSAF and FSAF is five hours or more, the following procedures are required: wind factors, equal time point (ETP) calculations, and in-flight fuel management.

11.7.7. Heading deviation checks are not required on Category II routes, tactical routes, or on aircraft without compasses. On Category I routes or route segments of 3-hours or longer, compute heading deviation for each compass system as soon as practical after initial level-off or coast out. Record deviation for all compass systems (see paragraph **11.10.**).

11.8. Flight Records. Flight progress will be recorded for Category I routes of three hours or longer. Record enough detail to reconstruct the mission. Units may publish local standards for log procedures in the unit supplement to **Chapter 10**.

11.8.1. This form will consist of planning and in-flight progress/proposed data, and will be completed in sufficient detail to fully evaluate or reconstruct the flight. Page 1 of the form should be completed when a CFP is not available on Category I routes. Page 4 (**Figure 11.2.**), or the in-flight section, will be used for proposed and actual lines with substantiation areas on the other side of the form (pages 2 and 3). The procedures below are general in nature and designed to accommodate a wide range of C-130 navigation equipment configurations.

11.8.1.1. Actual Line: GMT will be included and the line will contain actual observations and data obtained in-flight to substantiate the progress and position of the aircraft. This information should be used to validate/crosscheck preflight and previous proposed in-flight information.

11.8.1.2. Proposed Line: Each line will normally include “the best known information” required to proceed to a point or abeam a point down track indicated in the “CHECKPOINT” block. When an entry is the same as an entry above it, a check mark may be used to indicate “same as previous entry”.

11.8.1.3. Log Section. A position entry may be a fix, dead reckon (DR), or air positions.

11.8.1.4. DR Line. If a DR is logged, the GMT and DR symbol are to be entered in the first two columns.

11.8.1.4.1. DR Line - Course/Heading Information. Determine TC/GC using average DC, VAR, TP/DEV Corr, and CH. With a reliable computer (INS/SCNS/GPS) providing DA and GS, the WV block may be left blank; otherwise, average wind should be shown.

11.8.1.4.2. DR Line - Time/Distance-Speed Information. Record time since last position, air distance and/or ground distance from last position, and average groundspeed and/or average true air speed.

11.8.1.4.3. DR Line - ETA Information. Used to record the ETA information to the next waypoint(s) using the predicted GS for the coming leg(s).

11.8.1.5. Fix Line. If a fix is logged, the GMT and fix symbol are to be entered in the first two columns. Use the "Nav Aid Data" on Page 2 to record computer positions, radio aid and radar fix information, corrections, and any other information substantiating the fix.

EXCEPTION: Those lines required to meet the one hour requirement per 11.7.5.

11.8.1.5.1. Fix Line - Course/Heading Information. Fix line documentation will document information since last fix.

11.8.1.5.1.1. ACTUAL SIDE. The course flown should be measured and the line worked out to calculate actual Drift and Wind using average CH, VAR, and DEV. With a reliable computer (INS/SCNS/GPS) providing accurate information, only a TH and spot Wind need be shown.

11.8.1.5.1.2. PROPOSED SIDE. The course to be flown is to be measured and a CH derived based upon predicted average DC, VAR, and TP/DEV Corr. With a reliable computer (INS/SCNS/GPS) providing DA and GS, the Wind block may be left blank; otherwise, the predicted Wind should be shown.

11.8.1.5.2. Fix Line - Time/Distance/Speed Information. Used to record time since last position, air distance and/or ground distance from last position, and average groundspeed and/or average true air speed (e.g. for fix-to-fix WV computations).

11.8.1.5.3. Fix Line ETA Information. Used to record the ETA information to the next waypoint(s) using the predicted GS for the coming leg(s).

11.8.1.6. On Category I routes, when (INS/SCNS/GPS) are providing reliable information; only time position, average magnetic/true/grid heading, average true airspeed, altitude, and spot wind entries are required.

11.8.1.7. On Category II routes or portions of flights designed Category II, only ETA blocks need to be completed.

11.8.1.8. When numerous aircraft alter headings are made for weather, traffic, etc., (accomplishing log the entries impractical), all blocks on the ACTUAL/PROPOSED sides are not required to be filled in.

11.8.1.9. Airplots. To log an airplot, the airplot will be labeled in the "POS" column with the airplot position symbol. Log other information as needed.

11.9. Celestial Procedures.

11.9.1. Precomps. Numerous specialized techniques are discussed in AFPAM 11-216 and are also located in **Figure 11.4.**.

11.9.2. Celestial Heading Checks. See AFPAM 11-216 for a comprehensive discussion of celestial concepts.

11.10. Deviation Check Procedures.

11.10.1. Heading checks should be computed in the “Deviation Checks” section of AF Form 4116, page 2. Mid-time celestial heading checks may be recorded in the “Celestial Computations” section. When a heading check is performed based on INS/SCNS, note that in the precomp area of the deviation checks section. The AF Form 4116 deviation checks format solves for "deviation" (DEV) for all heading reference systems. Some navigation computers such as the SCNS allow the navigator to input compass “deviation.” In this case reverse the sign of the “deviation” to arrive at “deviation correction.”

NOTE: Compass deviation is not necessarily constant over time or after significant course changes. Navigators should reconfirm deviation on CAT I legs every 3 hours or after planned course changes of greater than 30 degrees.

EXCEPTION: A deviation check is not required on flights transiting Category I routes of less than three hours if:

(1) The aircraft is equipped with two or more operable heading systems (the standby compass is not considered a system for this requirement).

(2) The difference between systems does not exceed 2-degrees.

11.10.2. Dual INS Heading Checks. Deviation check not required.

11.10.3. Single INS/SCNS Heading Checks. Record and compare the INS/SCNS true heading with all compass systems.

11.10.4. In order to obtain an accurate celestial heading check, the exact ZN must be derived. Exact ZN is obtained by interpolating using exact longitude, latitude, declination, and LHA. ZN may also be derived from SCNS immediate page and the subpoint of the celestial body used for the heading check.

11.11. True Airspeed (TAS) Check Procedures.

11.11.1. Accomplish within one hour of initial cruise altitude. Record time of the check and altitude on the pressure altimeter. If using free air temperature gauge, record indicated outside air temperature (IOAT). Use the heat of compression table on AF Form 4116 to convert IOAT to true outside air temperature (TOAT). If using SCNS temperature, record TOAT.

11.11.2. Normally, navigators on all C-130 models can use 0 knots for indicated airspeed (IAS) to calibrated airspeed (CAS) correction and minus 3 knots for CAS to equivalent airspeed (EAS) correction for TAS above 270 (or minus 2 knots if less than or equal to 270).

11.11.3. ITAS - Indicated TAS. Record the TAS reading from the TAS meter and the SCNS/INS or other computer (if the aircraft is so equipped). Record the difference between computed TAS and this reading in the CORR block.

11.12. Pressure Differential Procedures.

11.12.1. Use the PRESSURE PATTERN COMPUTATIONS section of the AF Form 4116 to record the readings and solve for ZN. Explanation of these blocks follows:

11.12.1.1. TIME. Time of position.

11.12.1.2. ABS ALT. Absolute altitude recorded from the absolute altimeter.

11.12.1.3. PRESS ALT. Pressure altitude recorded from the barometric altimeter with 29.92 inches set in the Kollsman window.

NOTE: If the pressure altimeter internal vibrator is inoperative, tap the altimeter case lightly before reading. If initial pressure reading is taken below the transition altitude, the navigator will set 29.92 in the navigator's altimeter before recording pressure information.

11.12.1.4. D2. Algebraic difference between the absolute altitude and pressure altitude.

11.12.1.5. D1. Difference value from the previous D reading (previous D2).

11.12.1.6. D2 - D1 Algebraic difference between D2 and D1.

11.12.1.7. ETAS. Effective TAS, obtained by dividing the total distance along the effective air path by the elapsed time since the preceding position (previous D reading).

11.12.1.8. ZN. (Azimuth) the amount of left/right displacement (in NM) from the effective air path. Compute using the formula on the AF Form 4116.

11.12.1.9. MID LAT. The mid-latitude between preceding position and current DR position. Used to determine "K" in the AF Form 4116 or can be read from the MB-4 computer, indicated on the inner ring above the Latitude scale.

11.12.1.10. GD. Estimated ground distance between readings. Only required if computing Bellamy drift.

11.12.1.11. DRIFT (L/R). The Bellamy Drift Angle. Computed from formula given on the AMC Form 4116, page 3. See AFPAM 11-216 for addition options.

11.12.2. Plotting. If ZN is minus, plot to the right in the Northern Hemisphere (left in the Southern Hemisphere). If ZN is plus, plot to the left in the Northern Hemisphere (right in the Southern Hemisphere). Plot the Pressure Line of Position (PLOP) parallel to the effective air path (air path from the position at which D1 was obtained to the present air position). Displace the PLOP at ZN distance from the effective air path in the direction indicated by the sign of the ZN.

11.12.3. Pressure Altitude Change.

11.12.3.1. If the pressure altitude changes more than 500-feet between D readings, a correction must be applied to the previous D2. The correction is calculated by taking the TEMP DEV and multiplying it by 4. Take this result and multiply it by the number of thousands of feet altitude change. Apply this directly to the previous D2 to come up with the corrected D2 (reverse the sign if descending). See the AMC Form 4116 page 4 for the formula.

11.12.3.2. PASTAGRAM may also be used IAW AFPAM 11-216.

11.13. In-flight Fuel Management Procedures.

11.13.1. Use AF Form 4052, **Range Control Chart** to accomplish required in-flight fuel calculations.

11.13.2. Record fuel readings at level off time and regular time intervals (coinciding with entries on aircraft performance log), not to exceed 1 hour and 30 minutes. Use the worksheet on page 3 of the AF Form 4052 to complete in-flight fuel management computations.

11.13.2.1. ETA DEST. Best known arrival time at destination.

11.13.2.2. TIME. Time of the fuel reading.

11.13.2.3. GROSS WT. Weight of the aircraft at the given time.

11.13.2.4. PAGE NO. Page used in the appropriate fuel publication for the current altitude (lower altitude if predicted) and airspeed. Use only the constant altitude pages.

11.13.2.5. TEMP DEV. Compare TOAT to the standard temperature for the current altitude. Record the difference.

11.13.2.6. FUEL REM. Fuel quantity at that time. In the interest of safety, use the lower of the calculated or gauge fuels. Subtract any applicable in-flight endurance correction.

11.13.2.7. O/H FUEL. Overhead Fuel (item 13 of the fuel plan).

11.13.2.8. DIFF. Subtract O/H Fuel from FUEL REM.

11.13.2.9. FUEL ETE. Enter the PAGE NO. with DIFF fuel and GROSS WT. Apply TEMP DEV to obtain this endurance value.

11.13.2.10. ETE DEST. Subtract TIME from ETA DEST.

11.13.2.11. EXT TIME. Subtract ETE DEST from FUEL ETE. Report this value to the pilot. If this is a negative value, check the computation and values for errors. If they are correct, evaluate your destination options.

11.13.3. AF Form 4052, **Range Control Chart**.

11.13.3.1. Manual Construction. (**Figure 11.5.**)

11.13.3.1.1. "POINT NUMBER" represents the approximate level-off point (initial cruise altitude), 25, 50, 75, and 100 percent of the flight plan distance as indicated on AF Form 4116 or CFP.

11.13.3.1.2. Column A, "EN ROUTE AND DESTINATION FUEL": AF Form 4116 takeoff fuel minus en route reserve fuel.

11.13.3.1.3. Column B, "EN ROUTE FUEL": The fuel (en route + identified extra fuel) planned to be burned off by the time each of the given points defined in paragraph **11.13.3.1.1.** are reached.

11.13.3.1.4. Column C, "MINIMUM FUEL": Subtract Column B (EN ROUTE FUEL) from column A (EN ROUTE AND DESTINATION FUEL). This fuel is the minimum, at each given point, to fly from that point to destination with sufficient fuel to make a missed approach (if required), continue to the destination alternate, hold, make the planned approach, and land with 4,000 pounds of fuel. Minimum fuel will also include any identified extra fuel needed overhead the alternate (e.g., excess holding or for succeeding legs). The minimum fuel at the 100 percent point should be the same as required overhead fuel.

11.13.3.1.5. Column D, "DISTANCE": The flight plan distance for the given points listed in **11.13.3.1.1.** Obtained from AF Form 4116. This can be graphically depicted as either distance flown or distance remaining.

11.13.3.1.6. "DISTANCE FLOWN/REMAINING": Label the nautical miles to the destination along the horizontal scale. For distance flown start with 0 at the left and allow the major blocks to represent convenient increments of mileage. For CFP data, use distance remaining with 0 at the right side of the scale at destination. Mileage will be in descending order from left to right. Examples are depicted in Figures 11.7 and 11.8.

NOTE: The distance scale should be expanded to the maximum to give as large a presentation as possible.

11.13.3.1.7. Draw a vertical line on the graph representing total distance to destination and label this line with the destination name.

11.13.3.1.8. Estimated Performance/Minimum Arrival Fuel Lines. Estimated Performance is based on planned fuel at T/O, level off, and arrival plotted parallel to the minimum fuel line.

11.13.3.1.9. A "minimum arrival" line will be constructed by plotting fuel in column C versus distance in column D.

11.13.3.1.10. An "estimated performance" line will be constructed by plotting a line parallel to the minimum arrival line based on planned take-off, level off and arrival fuel.

NOTE: The difference between the estimated performance line and the minimum arrival line is reserve and unidentified extra fuel.

11.13.3.2. CFP Construction (see **Figure 11.6.**.).

11.13.3.2.1. An "estimated performance" line will be constructed by plotting a line using valid CFP Data (Fuel Remaining/Distance Remaining) at takeoff, L/O, and approximately 25, 50, 75, and 100 percent of the CFP distance. The 100 percent plot is derived by adding 5,000 lbs to the FUEL REMAINING on the final leg of the CFP. This compensates for the 5,000 lbs arrival bias on the CFP, and should represent actual gauge fuel overhead destination.

11.13.3.2.2. A "minimum arrival" line will be constructed by plotting a line parallel to the estimated performance line based on minimum diversion/required overhead destination fuel.

11.13.3.2.3. Fuel Assumptions:

11.13.3.2.3.1. Reserve is not a burn off fuel.

11.13.3.2.3.2. Last leg to destination on the CFP: BURNOFF has entered bias of 5,000 lbs for min. landing (4,000 lbs) plus approach and landing fuel (1,000 lbs) plus the fuel burned off on the last leg to destination. FLRM (FUEL REMAINING) has alternate and missed approach, reserve, and holding fuel.

11.13.3.2.3.3. The difference between the estimated performance line and the minimum arrival line is reserve and unidentified extra fuel.

11.13.3.2.3.4. Alternate Fuel: If the primary alternate is less than 200-NM from destination, fuel burn is computed at 10,000 feet cruise. If the alternate is over 200 NM the fuel burn is computed at terminal fuel flow.

NOTE: Minimum diversion/required overhead destination fuel is a total of alternate and missed approach, holding, and approach and landing fuel. Planned fuel overhead destination if obtained by adding 5,000 lbs from burn-off on the last line of the CFP to the FLRM.

NOTE: Plot vertical lines representing ETPs if required at the appropriate distance flown/remaining.

11.13.4. In-flight fuel management may also be accomplished using the following formulas:

11.13.4.1. [(Terminal fuel flow + Present fuel flow)] / 2 = Average Fuel Burn Rate

11.13.4.2. Present fuel - Overhead fuel = Usable Fuel

11.13.4.3. Usable fuel / Average fuel burn rate = Fuel ETE

11.13.4.4. Fuel ETE - ETE to destination = Extra Time

11.13.5. The navigator may terminate these procedures one hour from destination, when the Category I route segment is completed, or at the discretion of the Aircraft Commander.

11.14. Airborne Radar Approach Procedures.

11.14.1. VFR Operations. Units will submit VFR ARA approach plates for approval to NAF Stan/Eval (MAJCOM Stan/Eval if no NAF exists). During VFR, the minimum ceiling and visibility will be 1,500 feet and 3 miles. Use **Figure 11.3.** for ARA Construction Procedures. Publish approved VFR ARA approaches in **Chapter 10**. Chapter 10 should include SCNS ARA input data. If available, pilots will back up the navigator using a published instrument approach.

11.14.2. IFR Operations. Refer to AFI 11-202V3, and **Chapter 5** and **Chapter 8** for Self-Contained Approaches (SCA). Weather minimums will be established non-precision airfield minimums, or 500-feet and 1 mile, whichever is higher (300-feet and 1 mile for AWADS).

11.14.3. Use ground-based radar monitor, where available (IFR and VFR).

11.14.4. Planning and Coordination. Prior to entering the terminal area, the navigator will coordinate the following items with the pilot (see ARA briefing guide, AFI 11-2C-130V3 CL-5):

11.14.4.1. Desired pattern altitude and headings.

11.14.4.2. Distance on final where descent will commence.

11.14.4.3. Glide slope angle and initial rate of descent (normally not greater than 400-feet per NM).

11.14.4.4. Minimum descent altitude and missed approach. Missed approach will conform to published procedures for a usable approach, if available.

11.14.5. Terminology and Procedures.

11.14.5.1. Pattern Control. The navigator will advise the pilot when positive radar identification of the airfield complex is made.

11.14.5.2. The navigator will direct the aircraft by headings to the final approach course. For AWADS equipped units, navigators may advise the pilot to intercept the bank steering bar (as required), when flying computer ARAs.

11.14.5.3. During the approach, the navigator will advise the pilot of the drift and groundspeed. If pilots can view this information on the selected SCNS/INS display, this advisory is not required.

11.14.5.4. The turn onto base leg (if required) should be made to allow for a 10 NM final (or as required).

11.14.5.5. The navigator will state the distance from touchdown each mile from the end of the runway beginning 10-miles out. A glide path warning should be given 10 seconds prior to the "begin descent point."

11.14.5.6. The navigator will give heading information at least every nautical mile during the final approach. AWADS-equipped units are authorized to perform computer ARAs using AWADS equipment in VMC or IMC according to paragraph **11.14.1.** and paragraph **11.14.2.**.

11.14.5.7. Use **Chapter 5** procedures for required non-precision approach calls upon reaching the MDA.

11.15. Grid Procedures.

11.15.1. Definitions.

11.15.1.1. Grid North. Grid north is the direction of true north along or parallel to the Greenwich meridian. Along the 180 degree meridian (Polar charts), true south is the direction of grid north.

11.15.1.2. Grid Direction. Grid direction is measured from grid north, clockwise through 360 degrees, using any grid line drawn parallel to the 0 degree meridian.

11.15.1.3. Grivation. Grivation is the angle measured between magnetic north and grid north. It is used to obtain a magnetic heading (MH) from a grid heading (GH). Grivation is applied to GH in the same manner as variation is applied to true heading (TH).

11.15.1.4. Convergence angle. Convergence angle is the product of the longitude times the convergence factor. A Table for convergence angles at each degree of longitude is available in the margin of each navigation chart using the grid overlay.

11.15.1.5. Convergence factor. Convergence factor is the ratio existing between meridians as measured on the charts and the difference in degrees of longitude between them. The convergence factor is printed on each chart that uses the grid overlay.

11.15.1.6. Precession. Precession experienced during a given period of time equals the actual aircraft grid heading (GH) minus the gyro reading (GR).

11.15.1.7. Precession Rate. Precession rate is the precession converted to an hourly rate (example: precession = 2 degrees, period = 30 minutes; rate = 4 degrees per hour).

11.15.2. Grid formulas:

11.15.2.1. Northern Hemisphere:

11.15.2.1.1. Grid direction = true direction +W (-E) longitude (polar chart) or convergence angle.

11.15.2.1.2. Grivation +W -E = +W -E variation +W-E longitude (polar chart) or convergence angle.

11.15.2.1.3. Mag direction = grid direction +W (-E) grivation.

11.15.2.1.4. Grid heading = Mag heading -W (+E) grivation.

11.15.2.1.5. Grid heading = True heading +W (-E) longitude (polar chart) or convergence angle.

11.15.2.2. Southern Hemisphere. Reverse the sign of the longitude or convergence angle in the preceding formulas.

11.15.2.2.1. For gyro steering:

11.15.2.2.2. Grid heading - gyro reading = precession.

11.15.2.2.3. To alter heading: Initial grid heading (IGH) = desired grid heading (DGH) + or - 1/2 hourly precession rate x DR time.

11.15.2.2.4. Average grid heading: Mean grid heading between any two time periods.

11.15.2.2.5. RT/2 correction: Hourly precession rate {R} x DR time {T} divided by 2. (If precession is +, correction is -.).

11.15.3. Grid Log. The navigator will use this section on page 4 of the AF Form 4116 (**Figure 11.2.**), when grid navigation procedures are required. Block entries are as follows:

11.15.3.1. Time. Time of celestial heading/system heading observation.

11.15.3.2. TH. Observed/computed true heading.

11.15.3.3. CA/LONG. Enter +W -E longitude (polar chart) or convergence angle.

11.15.3.4. GH. Observed/computed grid heading.

11.15.3.5. GYRO #1, GYRO #2. On aircraft equipped with two independent gyro stabilized systems with numbers corresponding to aircraft systems (e.g. C-12 No. 1, N-1 No 2), circled number denotes the primary steering gyro. On aircraft whose systems are not numbered or do not correspond to the aircraft system, identify the primary steering gyro in "REMARKS".

11.15.3.6. GR. Gyro reading. Record the reading from the primary compass.

11.15.3.7. PREC. The amount of precession since the last heading shot (period precession): GH - GR = PREC.

11.15.3.8. RATE/CUM. The hourly precession rate based upon the precession indicated at the time of observation. Precession rate is derived from the period precession and the applicable elapsed time period (since the last compass reset). Example: 2 degrees precession in 40 minutes equals a 3 degrees/hour precession rate. This entry is required only when period precession is greater than one degree. The cumulative portion of the block is used for tracking the cumulative precession rate once a false latitude has been set.

11.15.3.9. LAT. The mid-latitude between the current observation and the next proposed observation.

11.15.3.10. FALSE LAT. The false latitude setting being used to eliminate precession. This entry is required only when a false latitude setting is used.

11.15.3.11. RESET. Whenever a gyro is reset, place a check mark in this block.

11.15.3.12. GC. Measured grid course to the next checkpoint.

11.15.3.13. DRIFT. The number of degrees (+ or -) of drift.

11.15.3.14. DGH. Desired grid heading. Apply anticipated DRIFT to GC.

11.15.3.15. RT/2 CORR. See paragraph **11.15.7.6.** and formula on the bottom of the AF Form 4116.

11.15.3.16. IGH. Initial grid heading. Used for alter heading. See paragraph **11.15.7.6.** and formulas on the AF Form 4116.

11.15.3.17. GRID ENTRY. Apply grivation (GRIV) to Magnetic Heading (MH) to obtain desired grid heading (DGH); or apply (LONG) or convergence angle (CA) to True Heading (TH) to obtain DGH. See formulas on the AF Form 4116.

11.15.3.18. GRID EXIT. Apply GRIV to DGH to obtain MH; or apply LONG or CA to DGH to obtain TH. See formulas on the AF Form 4116.

11.15.4. Grid Celestial Computations:

11.15.4.1. When plotting celestial lines of position (LOPs) in grid reference, apply longitude (polar chart) or convergence angle to the true azimuth and plot the grid azimuth.

11.15.4.2. When taking heading checks at high latitudes, it is advisable to place data into the periscopic sextant to give the true heading and convert this heading to grid by applying the assumed LONG/CA.

11.15.5. Construction and use of the ZN graph is optional. The ZN graph is based upon the route of flight and dead reckoning.

11.15.5.1. To construct the ZN graph:

11.15.5.1.1. Select three or four points for DR positions along the route approximately an hour apart. The first point may be for the time of grid entry.

11.15.5.1.2. Compute the LHA of a celestial body for each of these points.

11.15.5.1.3. Enter the appropriate H.O. 249 Volume and determine the true ZN of the body for each DR position.

11.15.5.1.4. Convert the true ZN to a grid ZN by applying LONG/CA for each DR position.

11.15.5.1.5. Plot the grid ZN on the horizontal axis for the graph and the GMT on the vertical axis.

11.15.5.1.6. Connect the plotted points with a straight line.

11.15.5.2. To use the ZN graph:

11.15.5.2.1. Enter with the proposed observation time and proceed horizontally to the ZN line.

11.15.5.2.2. Proceed vertically down from the ZN line to determine the grid ZN of the body.

11.15.5.2.3. Use grid ZN in the sextant to obtain an observed grid heading.

11.15.5.2.4. Accuracy of the ZN graph is dependent upon an accurate DR position; however, an error of 15-minutes in DR position can be tolerated without significantly affecting the accuracy of the ZN of the body.

11.15.6. Departure Requirements:

11.15.6.1. Polar true/grid courses as reflected in FLIP terminal charts will be used for departures in polar areas. Before takeoff, visually align the aircraft with the runway heading and set the polar true/grid course of the runway in the aircraft's directional gyros. The navigator will set applicable systems in gyro mode with the correct latitude set.

11.15.6.2. After reaching flight altitude, determine the polar true grid heading and reset the primary and secondary gyros. The type of chart being used will determine whether the heading will be polar grid heading or convergence grid heading.

11.15.7. En Route Requirements:

11.15.7.1. The Grid Entry/Exit section of the AF Form 4116 will be completed prior to heading reference changes. When entering grid operation, spot grivation should be applied to the computed magnetic heading to obtain desired grid heading (DGH). The aircraft will be established on the computed magnetic heading prior to resetting the heading references. When exiting grid, the computed magnetic headings will be the target heading when the compass systems are reset. In both cases, the computed magnetic headings will be compared to the flight plan to verify the accuracy of the courses measured and conversion data used. This will ensure the validity of initial entry headings and provide precise target headings for exit.

11.15.7.2. Normally, the grid heading will be checked each 30-minutes after grid entry. If the compasses are precessing 3 degrees per hour or less, hourly checks may be obtained after the first hour.

NOTE: On aircraft with reliable SCNS/INS, if the SCNS/INS heading is within 2 degrees of the initial celestial-derived grid heading, the SCNS/INS may be used to determine gyro precession.

11.15.7.3. Determine the precession information for each gyro after each heading check. When a gyro's precession is greater than 1 degree, reset the gyro to correct grid heading. When the period precession is 1 degree or less, the navigator may either reset the gyro or treat the precession as zero.

11.15.7.4. Whenever the period precession is greater that 1 degree (optional for 1 degree or less), the hourly precession rate will be removed by use of a false latitude setting. When the combined earth rate and gyro precession are less than +15 degrees/hour, the false latitude setting will totally compensate for precession. Two considerations are necessary:

11.15.7.4.1. Predicted precession becomes zero.

11.15.7.4.2. It may be necessary to adjust previous DR and air plot positions if the precession rate changes at subsequent heading checks. If this occurs, adjustments normally will be small and have negligible effect on DR and air plot accuracy; however, the effect should be considered.

11.15.7.5. To determine false latitude correction, enter the earth rate table with the desired latitude and extract the tabulated earth rate value. Algebraically combine the earth rate value and the observed hourly precession rate (use cumulative precession rate once a false latitude has been set). Re-enter the earth rate table with the combined value and extract the corresponding false latitude.

11.15.7.6. Only 15 degrees/hour can be removed by a false latitude setting. When the sum of earth and primary gyro precession rates exceeds +15 degrees, the navigator must artificially steer the aircraft (in effect, the aircraft will fly a gentle arc) to compensate for the amount of precession in excess of +15 degrees/hour. The formula used to correct the desired grid heading (DGH) to an initial grid heading (IGH) to fly appears on the AF Form 4116 as "RT/2 CORR" (note that the formula produces a correction, so the precession rate (RT) must be given its opposite sign). The precession rate (RT) used in the formula must be adjusted to reflect the time period in the DR ahead.

When "carrying" precession as suggested above, the navigator should consider several aspects of the navigational problem:

NOTE: When precession exceeds 15 degrees per hour, consider the compasses unusable.

11.15.7.6.1. If alter headings are not made at heading check times, precession will have accumulated by alter heading times and a correction (opposite sign of precession) should be applied to the IGH using the total precession correction (TP CORR) portion of the AF Form 4116.

11.15.7.6.2. If the precession rate changes at subsequent heading checks, it may be advisable to adjust previous DR and air plot positions described at paragraph **11.15.7.6.**.

11.15.8. Miscellaneous Procedures:

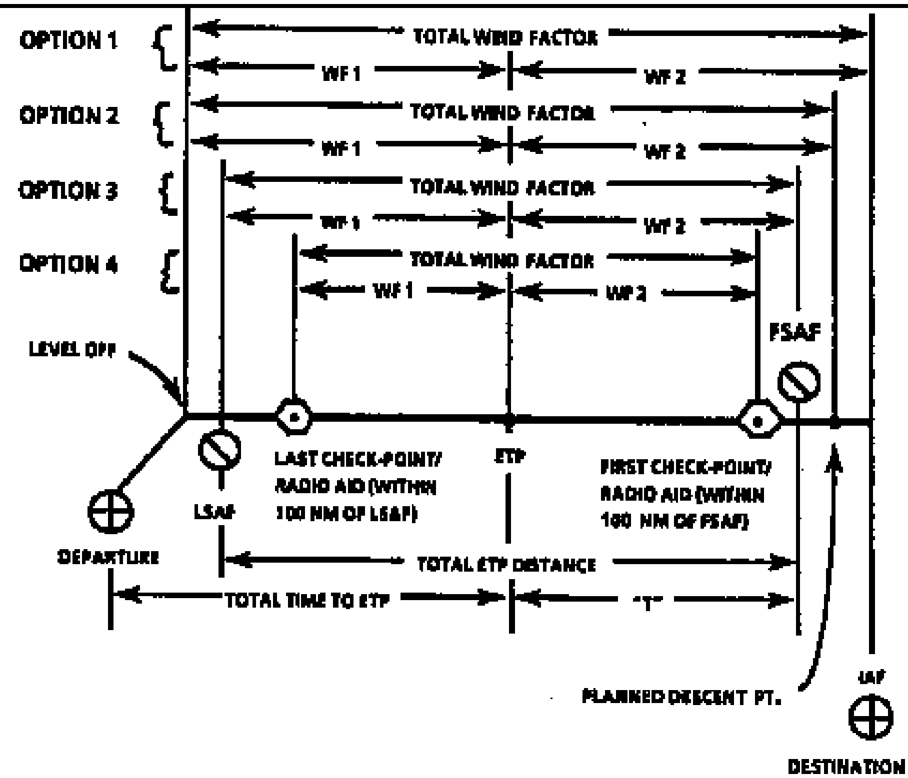
11.15.8.1. Normally, when changing charts or crossing the 180 degree meridian, only the reference changes; the heading of the aircraft is not altered. The change is made by comparing the grid courses and applying the difference to the gyro reading (old chart GC 350 degrees; new chart GC 331 degrees; GR 353; 350 - 331 = 019 = 334; reset the gyro to read 334).

11.15.8.2. Do not use the combined rhumb line/coriolis correction when flying DG. Use only coriolis correction for celestial observations.

11.15.8.3. Always recheck computations and formulas when a radical change in precession is observed.

11.15.8.4. Grid qualified navigators will maintain proficiency in grid procedures.

Figure 11.1. ETP Computations.



1. WIND FACTOR COMPUTATION (USE OPTION 1, 2, 3, OR 4):

   A. TOTAL WIND FACTOR:

$$\frac{\text{TOTAL WIND FACTOR DISTANCE}}{\text{TOTAL WIND FACTOR TIME}} = \text{AVERAGE GS}$$

AVERAGE GS - PLANNED AVERAGE TAS = TOTAL WIND FACTOR

   B. FIRST HALF WIND FACTOR (WF 1):

$$\frac{\text{DISTANCE FROM BEGIN PT. TO APPROX. MID-POINT}}{\text{TIME FROM BEGIN PT. TO APPROX. MID-POINT}} = \text{AVERAGE GS}$$

AVERAGE GS - PLANNED AVERAGE TAS = WF 1

   C. SECOND HALF WIND FACTOR (WF 2):

$$\frac{\text{DISTANCE FROM APPROX. MID-POINT TO END PT.}}{\text{TIME FROM APPROX. MID-POINT TO END PT.}} = \text{AVERAGE GS}$$

AVERAGE GS - PLANNED AVERAGE TAS = WF 2

2. ETP COMPUTATION:

   A.

$$\frac{\text{TOTAL ETP DISTANCE (LSAF TO FSAF)}}{\text{(WF 2 - WF 1) + 2(PLANNED AVG TAS)}} = \frac{\text{"T" (TIME IN MIN FROM ETP TO FSAF)}}{60}$$

   B. TIME (FROM DEPARTURE) TO ETP = TOTAL TIME TO FSAF - "T"

Figure 11.2. AF Form 4116, C-130 Flight Plan and Log Example (Page 4).

		ACTUAL										PROPOSED													
GMT	POSITION	TC/GC	W/V/DC	TH/GH	VAR -W +E	MH	DEV	CH	TAS/ALT	GD/AD/TIME	GS	TAS	TC/GC	W/V/DC	TH/GH	VAR -W +E	MH	TP CORR/DEV	CH	NEXT CHECK PT/CHECK PT	DIST	GS	TIME	ETA	REMARKS
0105	WASP	←				TAKE-OFF RWY 02				→		←			AIRWAYS/ RADAR VECTORS				→	ESNAG MAARI	FP ✓	FP ✓	FP ✓	0216 0248	
0145	COAST-OUT △#1	←				AIRWAYS				→		300	055	070/25 +1	056	+0	056	+0	056	ESNAG MAARI	157 150	293 ✓	+32 +31	0217 0248	
0215	⊙	053	060/30 +1	054	+0	054	+0	054	300 19.0	143 +30	286														
✓	△#2	054	054/20 +0	054					300 19.0	147 +35	294	300	014	060/18 +2	016	+0	016	+0	016	MAARI IBVOG	157 226	294 284	+32 +46	0247 0333	
0250	⊙	014	070/25 +3	017	+0	017	+0	017	300 19.0	172 +35	296														
✓	△#3	015	040/25 +2	017					300 19.0	167 +50	287	300	040	090/22 +1	041	+0	041	+0	041	IBVOG SEKSI	207 258	292 ✓	+43 +53	0333 0426	
0340	⊙	036	100/15 +3	039	+0	039	+0	039	300 23.0	242 +50	290														
✓	△#4	037	110/12 +2	039					300 23.0	242 +50	290	300	036	290/15 +2	038	+0	038	+0	038	SEKSI GUTAN	233 130	289 ✓	+48 +27	0428 0455	
0430	⊙	037	080/9 +1	038	+0	038	+0	038	300 23.0	238 +50	285														
✓	△#5	037	060/9 +1	038					300 23.0			300	035	060/9 +2	037	+1	038	+0	038	GUTAN MIPAP	128 185	287 ✓	+27 +39	0457 0536	
0520	⊙	037	030/9 +0	037	+1	038	+0	038	300 23.0	241 +50	289														
✓	△#6	037	035/9 +0	037					300 23.0			300	035	035/9 +0	035	+1	036	+0	036	MIPAP NIKET	75 139	286 ✓	+16 +19	0536 0605	
0610	⊙	035	055/15 +1	036	+2	038	+0	038	300 23.0	240 +50	287														
✓	△#7	035	035/6 +1	036					300 23.0			300	060	035/9 +0	060	+2	062	+0	062	NIPIL MEVIN	144 101	288 ✓	+30 +21	0640 0701	
0700	⊙	060	075/15 +1	061	+2	063	+0	063	300 23.0	240 +50	288														
✓	△#8	060	085/20 +1	061					300 23.0			300	037	085/20 +2	039	+3	042	+0	042	SADEK MYC	156 129	280 ✓	+34 +28	0734 0802	
0740	⊙	036	055/5 +0	036	+3	039	+0	039	300 23.0	194 +40	288														
✓	COAST-IN △#9	036	045/5 +0	036					300 23.0			←			AIRWAYS				→	MYC KAD	94 164	291 ✓	+19 +34	0759 0833	
0854	RODN	←				AIRWAYS/ ILS RWY 05R				→															
0859	←					LOG CLOSED				→								CAPT. LYF							

CLEARANCES/REMARKS

KANTO 88 CAF (RODN) 3.0 PU direct VTK 8.0 6.0 CLR ILS 05R RODN

CES CTX1 VIA 02 7422 8.0 11.0 134.4 19.0

@ 0330Z 23.0 ctc VVTS 8.9420 120.7 123.9 CLR MEVIN MYS TLN 067/170

LAND 0859

T/O 0105

7+54

PRIMARY SCNS SOLUTION PLOTTED: I-INS

4 OF 4 PAGES

Figure 11.3. ARA Pattern Construction Procedures.

ARA CONSTRUCTION PROCEDURES

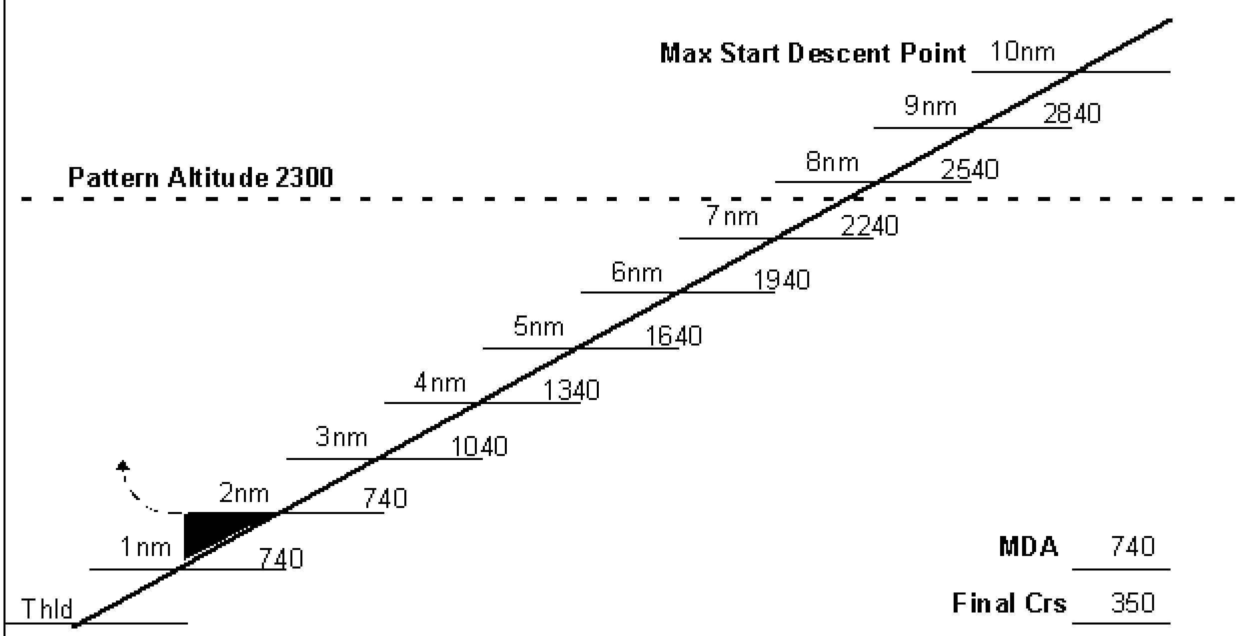
BRIEFING ITEMS
- Approach
- Minimums
- Missed Approach
- Landing Runway
- Timing
- Terrain

Fld Elevation	240
+500 ft	+500
MDA	=740

ABSOLUTE ALTITUDE AT DISTANCE OUT

DESC<	THLD	1nm	2nm	3nm	4nm	5nm	6nm	7nm	8nm	9nm	10nm
2.0	A	212	424	636	848	1060	1272	1484	1696	1908	2120
2.5	A	265	530	795	1060	1325	1590	1855	2120	2385	2650
2.83	A	300	600	900	1200	1500	1800	2100	2400	2700	3000
3.0	A	318	636	954	1272	1590	1908	2226	2544	2862	3180
3.5	A	371	742	1113	1484	1855	2226	2597	2968	3339	3710

Add "A" to alt above to build glideslope. Brief and fly ARA



RATE OF DESCENT IN FT/MIN

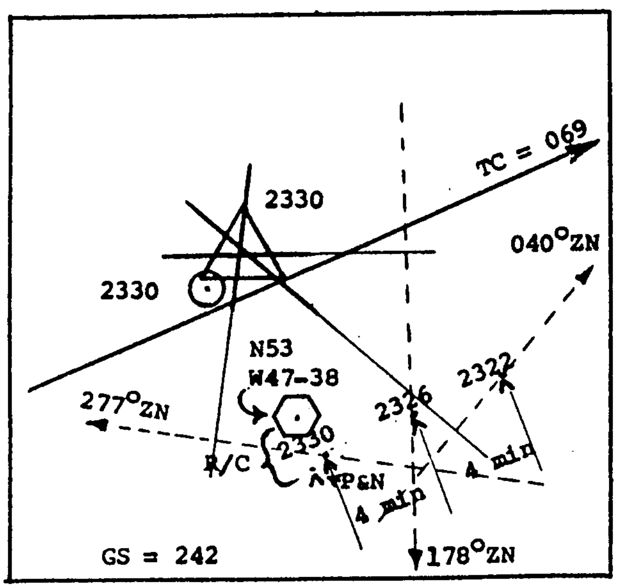
DESC<	FT/MIN	105K	110K	115K	120K	125K	130K	135K	140K	145K	150K
2.0	212	371	388	406	424	441	459	477	494	512	530
2.5	265	464	486	508	530	552	574	596	618	640	662
2.83	300	525	550	575	600	625	650	675	700	725	750
3.0	318	557	583	610	636	663	689	716	742	769	795
3.5	372	651	682	713	744	775	806	837	868	899	930

Figure 11.4. Celestial Plotting Example.

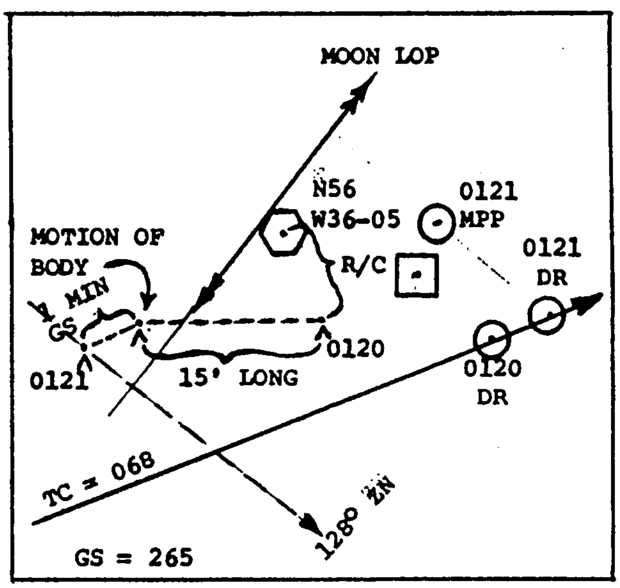
CELESTIAL COMPUTATION DATA

BODY	MIRFAK	ALTAIR	ARCT.				MOON		
TIME	2322	2326	2330				0120	Shot at 0121	
LAT			N53				N56	Moved assumed	
DEC			-				N5-04	position	
GHA			344-38				352-05		
± 360			-				-		
GHA			344-38				352-05		
LONG -W +E			W47-38				W36-05		
LHA	295	296	297				316		
HC	26-10	45-49	19-17				28-14		
CORR	+1	0	+1				-46		
CORR HC	26-11	45-49	19-18				27-28		
HO	25-59	45-21	19-36				27-33		
INTCP (T/A)	12A	28A	18T				5T		
ZN	040	178	277				128		
LONG/CONV	Coriolis/Rhumb.Corr=6.4R						Cor/Rhumb Corr =7.5R		
GRID ZN	TC=069/GS=242						TC=068/GS=265		

EXAMPLE 1(3-LHA) EXAMPLE 2(LATE SHOT)



PLOTTING EXAMPLE 1



PLOTTING EXAMPLE 2

Figure 11.5. AF Form 4052, Range Control Chart Example (Manual).

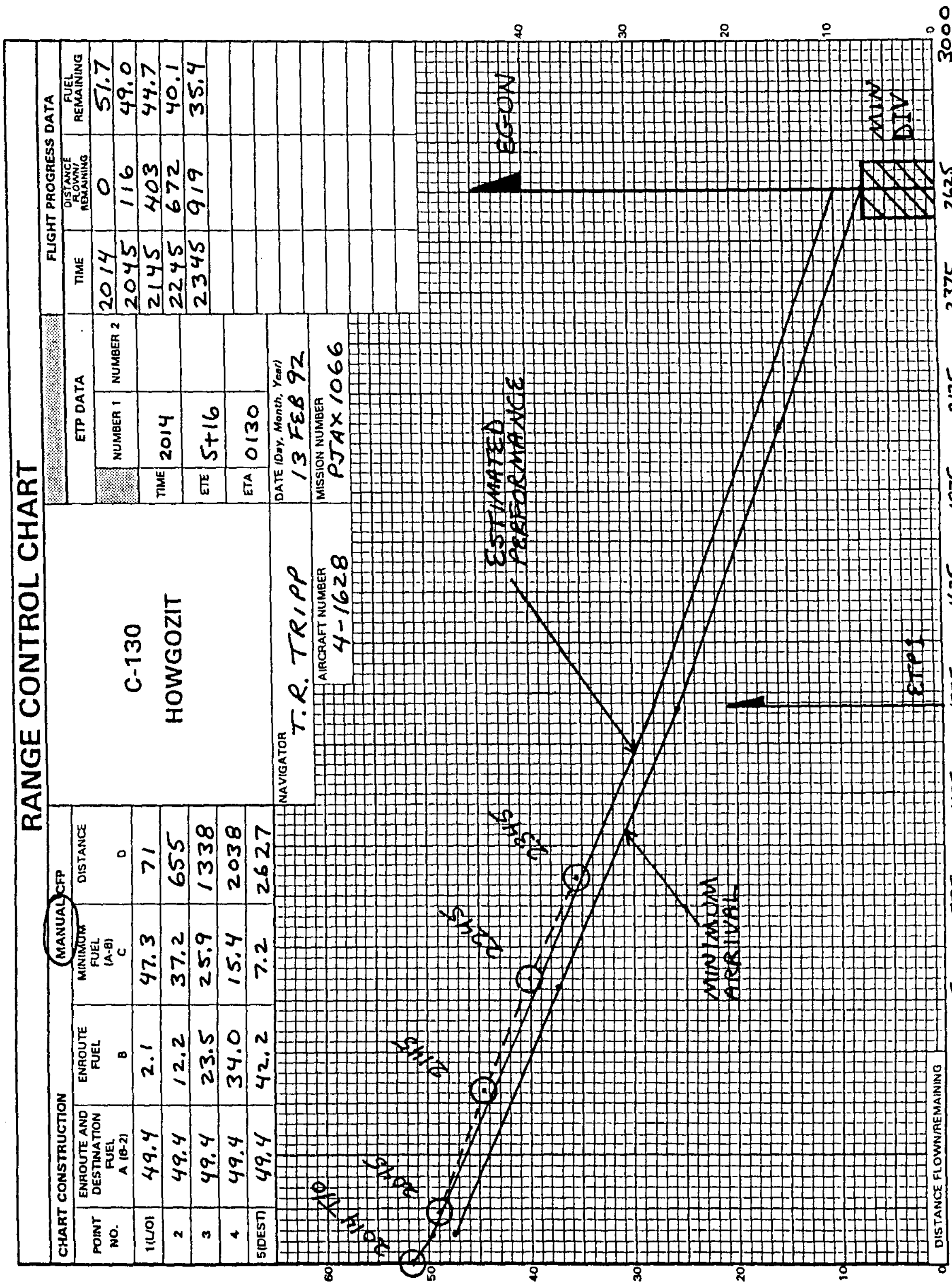
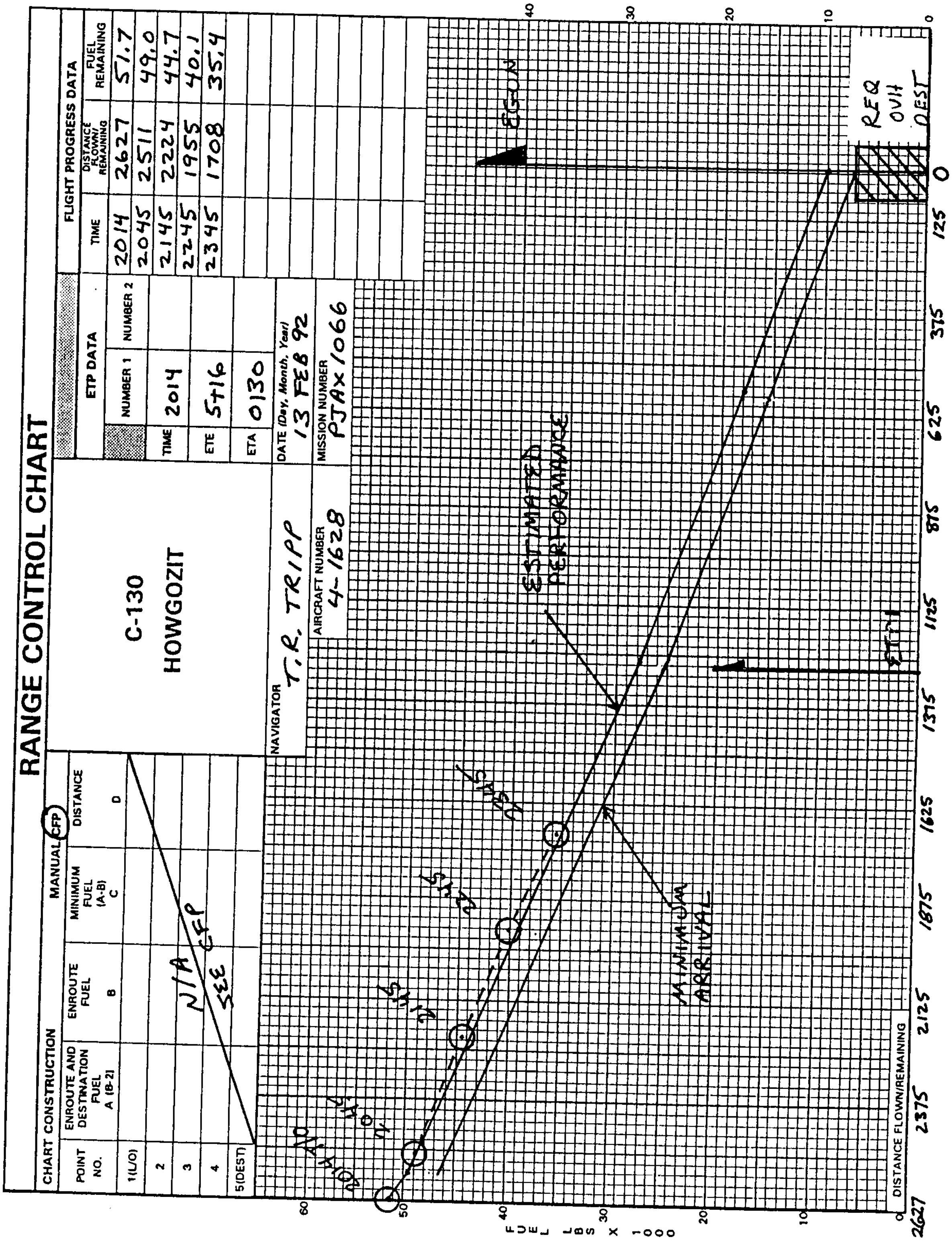


Figure 11.6. AF Form 4052, Range Control Chart Example (CFP).



Chapter 12

FLIGHT ENGINEER PROCEDURES AND FORMS

Section 12A—Normal Procedures

12.1. General. In addition to duties in the flight manual and other applicable Technical Orders, flight engineers will comply with the procedures and duties in this AFI. With the exception of hostile environment repair, these items need not be briefed and will be performed as normal procedures. The AC may assign other duties to the flight engineer (FE) as necessary.

12.2. Responsibilities. The FE is responsible to the AC for all inspections and procedures required by the applicable technical orders and DoD and Air Force Instructions (AFI).

12.3. Authority to Clear Red X Symbols. FEs are normally not authorized to clear a Red X. When the aircraft is on a Red X and qualified maintenance personnel are not available to clear it, the flight engineer may obtain authorization to clear the Red X from the logistics group commander, operations group commander (or designated representative), or chief of maintenance, in accordance with T.O. 00-20-1. At enroute stations, flight engineers are authorized to clear Red X symbols for: intake and exhaust inspections, dust covers and plugs installed, and aircraft panels removed and installed to facilitate other maintenance. Other crewmembers are not authorized to clear a Red X.

12.4. Aircraft Servicing. FEs are normally not required to refuel or de-fuel aircraft, however, the FE is qualified and authorized to accomplish these duties when maintenance personnel are not available. This policy is designed for support of the aircraft and its mission while away from home station. The applicable refueling and defueling checklists will be used during all refueling and defueling operations. If ground support personnel are not available, the AC will designate other crewmembers to assist the FE.

12.4.1. In order to comply with the intent of Primary Fuel Management and provide the greatest flexibility for maintenance and operations, standard ramp fuel loads in excess of 28,000 pounds should be loaded as follows:

12.4.1.1. Outboard main tanks. 7,500 pounds each is the minimum to be considered full.

12.4.1.2. Inboard main tanks. 6,900 pounds in each tank is the minimum to be considered full.

12.4.1.3. Any additional fuel required will be put in the auxiliary tanks and then the external tanks.

12.4.2. This loading will satisfy the minimum requirements for primary fuel management, prevent unnecessary fuel transfers and prevent fuel venting problems in most cases.

12.4.3. Operational commitments, availability of fuel services or planned landing criteria will in some cases dictate that these procedures be adjusted however, every effort should be made to comply with these guidelines and the flight manual to maximize airframe life.

12.5. Not Used.

12.6. Aircraft Structural Integrity Program (ASIP). Complete an AFTO Form 151A, **Individual C-130 Aircraft Usage Log**, IAW TO 1C- 130-101 on all flights.

12.7. Aircraft Systems/Forms Management.

12.7.1. The flight engineer will monitor aircraft systems during all flight and ground operations. Notify the pilot of all abnormal indications and take action as required.

12.7.2. In addition to the procedures in TO 00-20-5 and AFI 11-401, the flight engineer will assist the pilot in maintaining the AFTO Form 781.

12.8. TOLD Cards (AF Form 4064 and AF Form 4063).

12.8.1. All performance calculations will be based on 95 percent engines and without nosewheel steering. TOLD card computations will be accomplished using flight manual performance data or approved tabulated data.

12.8.2. When conducting flaps up landing data for training, compute and post V_{MCA} speeds for both configurations; flaps 50% and flaps up (normal boost). Example, V_{MCA}, in ground effect, one engine inoperative - 105/122.

12.8.3. Compute Ground Minimum Control Speed (V_{MCG}) as specified in the performance manual to include any and all correction factors. Due to the known errors of the V_{MCG} data contained in the performance manual, continue to add 15 knots to the computed speeds until corrected charts are published.

12.9. AF Form 4108, C-130 Fuel Log. Maintain AF Form 4108 according to **Attachment 2**.

12.10. Tactical Checklist. When the pilot or navigator, as required, initiates a tactical checklist, the flight engineer will read and ensure timely completion of all checklist items.

Section 12B—Hostile Environment Repair Procedures

12.11. General. Authority to use the Hostile Environment Kit and Repair Procedures is granted by Operations Group Commanders/Deputy Commanders for Operations when the aircraft is directed into a hostile or potentially hostile environment or in extreme cases where recovery of the aircraft or completion of the mission dictate their use. This authority is documented on the FRAG or Air Tasking Order. The Operations Group Commander/Deputy Commander for Operations may delegate this authority as necessary in cases where: (1) The unit is geographically separated from the parent unit, or (2) the unit is deployed or otherwise not co-located with the Operations Group Commander/Deputy Commander for Operations. All normal avenues of repair/recovery should be exhausted (when practical) prior to use of the Hostile Environment Repair Procedures. Procedures identified with a asterisk (*) are not considered a Hostile Environment Repair and may be accomplished with the ACs concurrence. When Hostile Environment Repair Procedures are actually employed, inform Numbered Air Force Stan/Eval by letter. Include a brief description of the circumstances and conditions leading to the decision to approve Hostile Environment Procedures.

12.12. Hostile Environment Repair Kit (HERK). Safe and efficient accomplishment of the hostile environment repair procedures requires a complete repair kit as prescribed in **Table 12.1.**. Units will identify repair kit inventory and issue procedures, in **Chapter 10**.

CAUTION: When installing or removing recommended jumper wires electrical arcing is possible.

12.13. Battery Dead or Damaged.

CAUTION: If the aircraft battery is damaged, disconnect and remove it from the aircraft. Use caution to avoid acid burns if the battery is leaking. When swapping batteries, the battery connector should be installed as rapidly as possible to preclude excess arcing.

CAUTION: When flying with a dead or otherwise disabled battery, ensure the DC Power Switch remains in the "BATTERY" position.

NOTE: If another aircraft is available, temporarily place its operable battery (or INS battery when available) in the disabled aircraft until at least one engine is operating.

NOTE: On INS equipped aircraft, the INS battery may be swapped with the aircraft battery and used for engine start. An alternative is to bypass the INS Reverse Current Relay. (See paragraph **12.14.**)

12.13.1. Jumping Battery - Aircraft to Aircraft.

12.13.1.1. Position aircraft nose to nose to allow the DC power cable (or cables) to reach.

12.13.1.2. Join both aircraft DC power cables by use of extender plug or brass bars listed in **Table 12.1.**.

12.13.1.3. Place cable from operating aircraft DC winch receptacle to external DC power receptacle of disabled aircraft.

12.13.1.4. DC power switch on disabled aircraft to "External DC" position.

CAUTION: Reduce DC load on disabled aircraft as much as possible to preclude the possibility of overloading the DC cargo winch current limiter.

12.13.1.5. Start APU/GTC on disabled aircraft.

12.13.1.6. ATM and Generator/APU Generator Switch - ON.

12.13.1.7. Jump battery relay using failed battery relay procedure. (See paragraph **12.15.**)

12.13.1.8. When battery relay is closed, remove jumper cables and continue with checklist.

12.13.2. If a usable replacement aircraft battery or another aircraft is not available, obtain two 12 volt or one 24 volt battery and jumper cables, or suitable heavy duty cable, modified as required. (DC cargo winch cable may be used.)

12.13.2.1. Use option one to connect the external batteries to the battery connector, or option two to connect the external batteries to the external DC power receptacle (see **Figure 12.1.**).

12.13.2.2. Insert stock into battery connector for option one.

12.13.2.3. Connect jumper cables to aircraft and batteries.

12.13.2.4. DC Power Switch - "Battery" for option one; "EXT DC" for option two.

NOTE: With DC power switch placed in the EXT DC position (option two) check the EXT DC PWR light ON. If the light is not illuminated, check all connections and battery polarity.

12.13.2.5. Start GTC/APU.

12.13.2.5.1. Control Switch - Start, Run.

12.13.2.5.2. Bus Tie Switch - Tied.

12.13.2.6. ATM and generator/APU generator - ON, checked.

12.13.2.7. If option two was utilized, jump battery relay using failed battery relay procedure. (See paragraph **12.15.**).

12.13.2.8. Start an engine and place the generator switch to ON.

12.13.2.9. Disconnect jumper cables.

12.14. Bypassing the INS Reverse Current Relay (RCR). ***NOTE:*** This method should only be used if the INS battery cannot be swapped into the aircraft battery position.

12.14.1. If the aircraft battery is damaged, disconnect and remove it from the aircraft. Use caution to avoid acid burns if the battery is leaking.

12.14.2. Open the Pilot's upper circuit breaker panel.

12.14.3. Jump the INS RCR by installing a #10 jumper wire from the APP terminal to the BATT terminal of the reverse current relay (see **Figure 12.12.**).

12.14.4. Check the DC voltmeter in the ESS DC BUS position to verify the bus is powered.

12.14.4.1. If the ESS DC BUS is not powered, bypass the relay as follows:

12.14.4.1.1. Remove all power from the aircraft.

12.14.4.1.2. Disconnect the INS battery.

12.14.4.1.3. Bypass the INS RCR by installing a #4 jumper wire from the GEN terminal to the BAT terminal of the reverse current relay (see Figure 12.13.).

12.14.4.1.4. Connect the INS battery.

12.14.5. Start GTC/APU.

WARNING: Fire protection is not available for the GTC/APU, until the Battery Relay is jumped.

12.14.5.1. Place Bleed Air Valve switch to OPEN (airplanes with ATM).

12.14.6. Place ATM and generator/APU generator switch to ON. Check Voltage and Frequency.

12.14.7. Remove #10 jumper wire from the INS Reverse Current Relay (RCR).

12.14.8. Jump the battery relay using Failed Battery Relay procedure. (See paragraph **12.15.**)

WARNING: If the INS RCR has been bypassed by installing the #4 jumper wire the ISOLATED DC bus nor the ESSENTIAL DC bus can be isolated using bus isolation procedures in the flight manual.

12.15. Failed Battery Relay.

12.15.1. DC power switch - BATTERY.

12.15.2. Jump battery relay by momentarily touching terminals "A-1" to "A-2" using the #10 jumper wire (see **Figure 12.2.**).

12.15.3. Check the battery voltage on voltmeter to verify closing of relay. (The voltmeter should read bus voltage.)

12.15.4. If battery relay fails to close, bypass the relay as follows:

12.15.4.1. Remove all power from the aircraft.

12.15.4.2. Disconnect the aircraft battery and INS battery.

12.15.4.3. Install a #4 jumper wire between terminals "A-1" and "A-2".

12.15.4.4. Connect the aircraft battery and INS battery.

WARNING: Fire protection is not available for the GTC/APU until the aircraft battery bus is powered. If an engine fire or nacelle overheat is indicated and battery relay has opened, install a #4 jumper wire from terminals "A-1" and "A-2" to power the battery bus.

CAUTION: When flying with a dead or otherwise disabled battery, ensure the DC Power Switch remains in the "BATTERY" position.

12.16. Failed RCR between Isolated and Essential DC Bus .

12.16.1. Open pilot's side circuit breaker panel.

12.16.2. Install a #10 jumper wire between the SW post and the APP postb (see **Figure 12.2.**).

12.16.3. If the RCR fails to energize, bypass the relay as follows:

12.16.3.1. Remove all power from the aircraft.

12.16.3.2. Disconnect the aircraft battery.

12.16.3.3. Install a #4 jumper wire between the BATT and GEN terminals (see **Figure 12.2.**).

12.16.3.4. Connect the aircraft battery.

***WARNING*:** The Essential DC bus cannot be isolated using bus isolation procedures contained in the flight manual.

NOTE: When the #4 jumper wire is used on the RCR, the Iso DC on Batt/Batt Disc light will remain ON, even though the Essential DC bus is powering the Isolated Bus.

12.17. Not Used.

12.18. Not Used.

12.19. *GTC Stalls and Fails to Accelerate to "On Speed".

12.19.1. Hold fingers over the acceleration limiter holes (see **Figure 12.3.**) while an assistant starts GTC. Place and remove fingers over the holes several times during the start cycle until the start cycle sustains itself.

12.20. GTC Fails to Rotate (No start light).

12.20.1. Check the following prior to proceeding with the hostile environment repair procedure: GTC control circuit breaker, GTC fire handle, Isolated DC bus powered, and check GTC doors to ensure they are fully open.

12.20.2. For a failed door actuator, (doors open and close but do not fully open) disconnect the GTC door actuator, at attachment point on inside of upper door. Prop doors open (use broom handle, fuel dip stick, etc.). Disconnect door actuator cannon plug and install jumper wire from pin “D” to pin “E” and attempt restart.

12.20.2.1. When finished with the GTC, attach door actuator to upper door, remove jumper wire, and install cannon plug back on actuator. Use door switch to close door.

12.20.3. For failed door actuator (doors not open or not opened enough to allow disconnecting of actuator), remove four (4) screws in upper door. This will release the door actuator attaching bracket on which the door bypass switch is located. Prop doors open and attempt start.

NOTE: Ensure bypass switch is fully extended.

12.20.3.1. When finished with GTC, close and secure the doors using two of the four bypass switch mounting bracket screws.

12.20.4. If the limit switch is suspected faulty, at upper forward area of the intake, disconnect the two wires to the door bypass switch and connect the two input leads together. This will bypass the limit switches.

12.20.4.1. Start GTC.

12.21. GTC Fails to Rotate (Start Light On).

12.21.1. Remove all electrical power.

12.21.2. Open pilot's side circuit breaker panel.

12.21.3. Check GTC starter current limiter; (see **Figure 12.2.**) if bad or suspect; replace as follows:

12.21.3.1. Disconnect battery.

12.21.3.2. Remove and replace current limiter with spare.

12.21.3.3. If no spares are available, open copilot's upper circuit breaker panel cover, remove cargo winch current limiter and use as a replacement.

12.21.4. If current limiter is good, check GTC starter for broken wires and repair as necessary (see **Figure 12.3.**).

12.21.5. Connect battery and attempt to start. If no rotation, rap starter relay and attempt another start.

12.21.6. If GTC still will not rotate, place the GTC control switch to START momentarily to energize the relay, then release the switch to RUN. Place a #4 jumper wire between post A1 and A2 of the GTC relay (see **Figure 12.2.**) until the start light goes out, then remove the jumper wire.

12.22. *GTC Fuel Vapor Lock.

12.22.1. Use petcock drain on bottom of aircraft below GTC to drain fuel while motoring GTC, then attempt start (see **Figure 12.4.**).

12.22.2. If no fuel is present at petcock drain, check GTC fuel shutoff valve opening by momentarily positioning GTC control switch to "START" then "OFF".

12.22.3. If fuel shutoff valve fails to operate, remove cannon plug and open the valve manually.

12.22.4. Remove fuel line at GTC burner can and motor GTC until a steady stream of fuel is noted. This procedure may require several attempts to attain desired results.

12.22.5. Reconnect the line and attempt another start.

12.23. *GTC Rotates - Negative Ignition.

12.23.1. Check oil quantity.

12.23.2. Attempt a start while depressing and holding the oil primer button. Release the button when the GTC lights off.

12.24. Starting GTC with Failed Oil Pressure Switch.

12.24.1. A failed oil pressure switch can be detected during the start cycle by observing no ignition firing noise during start attempt and that fuel is present at the fuel pressure regulator drain and no detectable fuel pressure present in the fuel nozzle hose. (See **Figure 12.3.**)

12.24.2. Remove oil line to the oil pressure switch and momentarily rotate GTC. (Oil should spurt from the line opening.)

12.24.3. Remove oil pressure switch cannon plug and place jumper wires from pin "A" to pin "B" for ignition and from pin "C" to pin "D" for fuel. Secure the jumper wires with tape.

12.24.4. Attempt to start the GTC. If the oil pressure switch was faulty the start should be successful.

12.25. APU Door Fails To Actuate.

12.25.1. Remove power from aircraft.

12.25.2. Remove APU compartment access panel and unsnap the APU heat shield blanket in the upper compartment, or remove the APU door actuator panel located aft of the APU door.

12.25.3. Remove the actuator cannon plug and install it on the APU (failed actuator) start receptacle (see **Figure 12.7.**).

12.25.4. If actuator is failed in the closed position, remove the actuator mount bolt from the fuselage and reposition the actuator to the INOP actuator position (see **NOTE 1**, **Figure 12.7.**).

NOTE: This will position the door to 35 degrees open for engine start only. It must be positioned to the closed position prior to flight.

12.25.5. If the actuator is failed in an intermediate position, install the dummy actuator rod.

NOTE: This will position the door to 15 degrees open for engine start.

12.25.6. Reinstall the heat shield blanket and secure the panel.

CAUTION: During hot weather conditions, delay operation of the APU until immediately prior to engine start; then operate the APU only long enough to start one engine.

CAUTION: APU operation in flight with the door in the fixed flight position is not recommended since the door is part of in-flight fire protection and provides fire containment within the fire proof area.

12.26. *APU Fails To Rotate (Start Light Fails to Illuminate).

12.26.1. Check the following items.

12.26.1.1. APU control circuit breaker, IN.

12.26.1.2. APU fire handle, IN.

12.26.1.3. Isolated bus for available power.

12.26.2. If the above items are checked and in the normal operating configuration, the Auto Start Relay (ASR, upper relay) on the APU is inoperative (see **Figure 12.6.**). Swap the ASR and the Fuel Holding Relay (FHR, lower relay) and attempt another start.

12.27. APU Fails To Rotate (Start Light Illuminates).

12.27.1. Remove all electrical power from aircraft.

12.27.2. Open pilot's side circuit breaker panel.

12.27.3. Check APU current limiter, if bad or suspect, replace as follows (see **Figure 12.2.**):

12.27.3.1. Disconnect the aircraft battery.

12.27.3.2. Remove and replace the current limiter with available spare.

12.27.3.3. If no spares are available, open the copilot's upper circuit breaker panel and remove the cargo winch current limiter and use as a replacement for the APU current limiter.

12.27.3.4. If the current limiter is good, check APU starter (see **Figure 12.6.**) for broken wires and repair as necessary.

12.27.3.5. Connect the aircraft battery and attempt another start. If no rotation is noted, "tap" the start relay.

12.27.3.6. If APU still will not rotate, place the APU control switch to START momentarily, then release the switch to RUN. Place a #4 jumper wire between post A-1 and post A-2 of the APU start relay until the start light goes out, then remove the jumper wire.

12.28. APU Rotates - Negative Ignition - No Ignition Noise.

12.28.1. Swap the Fuel Holding Relay (FHR) with the Auto Start Relay (ASR) (see **Figure 12.6.**).

12.28.2. Attempt to start APU.

12.28.3. If APU fails to start - Remove oil pressure switch cannon plug and place a jumper wire from pins "A" to "B" (ignition) and another jumper wire from pins "C" to "E" (fuel). Secure with tape.

CAUTION: Prior to jumping oil pressure switch, ensure oil pump is operating by removing the oil pressure line from the pressure switch and motor the APU. Oil should spurt from the line if the pump is working.

12.28.4. Attempt to start the APU.

12.28.5. If APU does not start, the igniter, exciter, or ignition harness may be faulty.

12.29. APU Rotates - Negative Ignition - With Ignition Noise.

12.29.1. Manually open the APU motor operated fuel shutoff valve as follows:

NOTE: APU shutoff valve is located in the aft outboard corner of the number two drybay (tag ID "O").

12.29.1.1. Ensure the APU control switch is in the "OFF" position.

12.29.1.2. Pull the APU control circuit breaker on the isolated DC bus.

12.29.1.3. Remove the number 2 dry bay access panel.

12.29.1.4. Remove APU fuel shutoff valve cannon plug and secure.

12.29.1.5. Manually open the APU fuel shutoff valve.

12.29.1.6. Reinstall the number 2 dry bay panel.

12.29.2. Attempt to start APU.

12.29.3. If APU fails to start, swap the APU fuel control solenoid operated shutoff valve with the overspeed test solenoid located on the air shroud. Look on the inboard side of the APU across from the Auto Start Relay (see **Figure 12.5.**).

12.30. APU Will Not Stay Running - After On Speed.

12.30.1. Disconnect forward bleed air pressure line from overspeed test solenoid valve, and plug with a number 4 plug (see **Figure 12.5.**).

12.30.2. Start APU. If APU continues to run, the overspeed test solenoid is bad.

WARNING: To shut down the APU the fire handle must be pulled.

NOTE: Reset fire handle after rotation stops to prevent aircraft battery drain.

NOTE: The APU is protected from overspeed by the mechanical flyweight system in the centrifugal speed switch assembly.

12.31. Leaking Brakes.

12.31.1. Disconnect brake lines from both sides of the brake shuttle valve.

12.31.2. Use plugs and caps from the HERK kit to seal the brake lines and shuttle valve.

12.31.3. Secure disconnected hose ends to prevent interference with landing gear movement during retraction and extension.

NOTE: Both landing and takeoff performance calculations will be affected by a disconnected brake. Recommend using RCR of 5 for all performance calculations.

12.32. Moving an Aircraft with Flat Main Landing Gear Tire.

WARNING: Use this procedure only as a last resort to move an aircraft out of a hostile environment. Reduce aircraft weight as much as possible by unloading cargo, defueling , or burning off fuel. Some fuel may be transferred out of the wing corresponding to the flat tire and into the opposite wing. Be aware of wing tip and propeller ground clearance.

12.32.1. Install main gear towing/jacking fitting on the strut with the flat tire.

12.32.2. Install a 10,000 lb. chain around the top of the strut above the upper track shoes.

12.32.3. Connect a tiedown device to the towing fitting. Connect the chain to the device and tighten.

12.32.4. Open the Schrader valve at the top end of the MLG strut and bleed all air pressure from the strut.

WARNING: Do not open Schrader valve more than 3/4 of a turn. It may be necessary to use the valve stem to bleed the pressure from the strut. Do not allow the lower nut to loosen. If the lower nut becomes loose it may allow the Schrader valve to blow out of the strut body.

12.32.5. Compress the strut by any means possible such as the use of a "J" bar, chocks, milk stool or taxiing the aircraft onto shoring in order to elevate the flat tire.

12.32.6. When the strut has been compressed to the maximum extent possible, tighten the tiedown device.

12.32.7. Remove the flat tire if time and situation permits.

12.32.8. Flight should be made with the landing gear extended and the landing gear control circuit breaker pulled. When safely airborne, pull the touchdown relay circuit breaker. Refer to the flight manual for airspeed limitations with landing gear extended. After landing, reset the touchdown relay circuit breaker.

12.33. Failed Engine Driven Hydraulic Pump.

12.33.1. Disconnect the failed engine driven hydraulic pump from the gearbox and secure to any available structure with safety wire. Do not disconnect hydraulic lines.

12.33.2. Install a starter pad in place of the failed hydraulic pump.

12.33.3. If time and resources permit, the pump may be removed from the nacelle as follows:

12.33.3.1. With the ESS DC bus powered, place the corresponding hydraulic pump switch to the OFF position. This will close the hydraulic shutoff valve.

12.33.3.2. Disconnect and plug all hydraulic lines to the pump.

12.33.3.3. Remove the failed pump and install a starter pad in its place.

CAUTION: The hydraulic pump switch must remain in the OFF position as long as the hydraulic pump is removed.

12.34. Failed Fuel Valve(s).

12.34.1. Locate the failed valve(s) and remove the cannon plug(s).

12.34.2. Manually open or close the valve(s) by actuating the manual arm.

NOTE: On some aircraft, the dump mast shutoff valves must be manually closed to refuel. Insure these valves are reopened prior to flight.

12.35. Failed Speed Sensitive Switch.

12.35.1. Pull Ignition Control Circuit Breaker on Copilots Lower Circuit Breaker Panel.

12.35.2. Open lower left side engine cowling on the affected engine.

12.35.3. Remove the speed sensitive control cannon plug (see **Figure 12.8.**).

12.35.4. Install the pre-wired cannon plug from the Hostile Environment Repair Kit and secure it in place (see **Figure 12.8.** and **Figure 12.10.**).

CAUTION: Pre-wired cannon plugs used as jumpers must be wired as shown in **Figure 12.10.**.

12.35.5. Secure all engine cowling.

12.35.6. Begin the start sequence (in normal ground idle) while watching tachometer.

12.35.7. At 16% engine RPM, reset the Ignition Control Circuit Breaker.

12.35.8. At 94% RPM, pull the Ignition Control Circuit Breaker.

NOTE: The secondary fuel pump pressure light will be illuminated and the pumps will be in parallel operation until the Ignition Control Circuit Breaker is pulled.

12.35.9. After landing, use normal ground idle only and shutdown the affected engine as follows:

12.35.10. Ignition Control Circuit Breaker - RESET.

12.35.11. Condition lever - GROUND STOP.

NOTE: When the Ignition Control Circuit Breaker is reset prior to engine shutdown, approximately two seconds is required for the fuel control shutoff valve to close. If the engine continues to run when the condition lever is placed in GROUND STOP, place the condition lever to FEATHER.

12.35.12. When the fuel flow indicator drops to zero and RPM is decreasing, pull the Ignition Control Circuit Breaker.

12.36. Failed Ignition Control Relay.

12.36.1. Pull the Ignition Control circuit breaker.

12.36.2. Open the lower left engine cowling and locate the ignition control relay (see **Figure 12.8.**).

12.36.3. Disconnect the cannon plug from the relay and install the prewired cannon plug from the repair kit.

CAUTION: Pre-wired cannon plugs used as jumpers must be wired as shown in **Figure 12.10.**

12.36.4. Close and secure cowling.

12.36.5. During engine start proceed as follows:

12.36.5.1. At 16 percent RPM, reset the Ignition Control circuit breaker.

12.36.5.2. At 65 percent RPM, pull the Ignition Control circuit breaker.

12.36.6. For engine shutdown following landing, proceed as follows:

12.36.6.1. Reset the Ignition Control circuit breaker.

12.36.6.2. Place the condition lever to GROUND STOP.

12.36.6.3. When fuel flow drops to zero and RPM decreases, pull the Ignition Control circuit breaker.

12.37. Failed Speed Sensitive Valve.

CAUTION: This procedure will render the torquemeter shroud anti-icing system inoperative. Icing conditions should be avoided.

12.37.1. Open the lower left side engine cowling on the affected engine.

12.37.2. Disconnect the air supply line to the speed sensitive valve (see **Figure 12.8.**) at the bottom of the filter element installed in the line and install a #6 plug in the open line.

12.37.3. Disconnect the torquemeter shroud anti-icing line at the left side of the balance line fitting and secure it.

12.37.4. Disconnect the line from the top side of the speed sensitive valve and connect it to the balance line fitting where the torquemeter shroud anti-icing line was connected.

12.37.5. Secure any loose hardware then close and secure engine cowling.

NOTE: Do not start the affected engine first. Select another engine for the first engine to be started in order to supply bleed air to the affected engine.

12.37.6. Place the Engine Inlet Duct Anti-icing switch for the affected engine to ON.

12.37.7. Start the affected engine while watching RPM and standing by to activate the Prop and Engine Anti-icing Master switch.

12.37.8. At 94% engine RPM, place the Prop and Engine Anti-icing Master switch to MANUAL. The acceleration bleed valves should close at this time.

WARNING: When the "Prop and Engine Anti-ice Master Switch" is selected to the MANUAL position, the engine anti-ice and prop anti-ice/de-ice systems will be actuated if their respective switches are turned on. These switches are normally turned on during the Before Takeoff Checklist but should be delayed using this procedure unless absolutely necessary for safe operation. Turning these switches to the on position with the Prop and Engine Anti-icing Master Switch selected to MANUAL will activate the systems and rob the engines of torque. Overheating of the blade/spinner anti-ice/de-ice systems will occur if the aircraft remains on the ground for longer than the two cycle operating limit.

NOTE: In this configuration the affected engine will have continuous anti-icing and an associated reduction in torque will be noted.

12.37.9. After landing, shutdown the engine in normal ground idle.

CAUTION: Do not use "Low Speed Ground Idle" during ground operations. To do so may cause the engine to stall/over temp.

12.38. Failed Fuel Shutoff Valve on Fuel Control.

12.38.1. Open lower left side cowling on affected engine.

12.38.2. Remove the defective fuel control shutoff actuator (Geneva lock) from the fuel control (see **Figure 12.8.**).

12.38.3. Insert a small common screwdriver into the spline end of the fuel control and rotate in a counterclockwise direction until the fuel control opens. There will be no fuel leakage from where the actuator was removed.

12.38.4. Close the engine cowling and secure all fasteners.

NOTE: During engine start, abnormal situations such as excessive fuel coming from drain mast, tailpipe torching and a higher than normal start TIT can be expected.

12.38.5. For engine shutdown, place the condition lever to FEATHER rather than GROUND STOP for the affected engine.

12.39. Failed Engine Fuel Drip Valve.

12.39.1. Use enrichment on next engine start. The sudden surge of pressure should close the drip valve.

12.39.2. If enrichment fails to close the drip valve, shutdown the engine and plug or crimp the drip valve drain valve closed.

12.40. Prop Fails To Rotate (No Light In Button) (GTC Equipped Aircraft).

CAUTION: Insure the oil shutoff valve circuit breaker is set (in).

12.40.1. If it is determined or suspected that no power is available to the starter button, proceed as follows:

12.40.1.1. Select another engine which is not operating and close its bleed air valve. (This bleed valve must remain closed throughout the start cycle.)

12.40.1.2. Start the defective engine normally while simultaneously holding in the starter button for the selected non operating engine. Both buttons must be held in until 60 percent RPM.

12.41. Prop Fails To Rotate (No Light In Button) (APU Equipped Aircraft, Engine Ground Start Interlock Relay Defective).

12.41.1. Pull the ignition and oil shutoff valve circuit breakers.

12.41.2. Locate the Ground Start Interlock Relay on the aft upper right side of FS 245.

12.41.3. Disconnect wire on "A1" terminal of relay and reconnect it to "A2" terminal with existing wire.

12.41.4. Reset ignition and oil shutoff valve circuit breakers and attempt start.

12.42. Failed Bleed Air Valve (Engine Fails To Rotate).

12.42.1. Place the bleed air valve switch to "OPEN". Open horse collar and “tap” the motor mechanism on the bleed air valve.

12.42.2. If the valve still fails to open, remove the motor from the valve. Manually open the valve and secure the lever to one of the mount holes with safety wire.

***WARNING*:** Once bleed air valve has been secured in the open position, it will not be possible to close the valve for wing isolation procedure. Engine shut down will be required to isolate wing.

12.42.3. Close the horse collar and attempt engine start.

12.43. Failed Bleed Air Regulator (Engine Fails To Rotate).

12.43.1. Pressurize bleed air manifold.

NOTE: Bleed air regulators require bleed air to operate.

12.43.2. Place bleed air regulator switch to “OVERRIDE”.

12.43.3. Open horse collar and “tap” the valve.

12.43.4. If valve still fails to open, manually lock the valve in the "OPEN" position.

WARNING: Once the bleed air regulator has been locked in the open position, it will not be possible to close the valve for wing isolation procedure. Engine shut down will be required to isolate wing.

12.44. Severe Fuel Leaks.

12.44.1. Fuel leaks caused from punctures or small arms fire can be plugged by using the wooden plugs and Pig Putty from the kit. If a high number of plugs are used, it may be necessary (as time permits) to break or cut them off near the wing surface to reduce drag.

12.45. Failed Radome Anti-Icing Valve (Stuck Open).

12.45.1. This malfunction can be recognized by a rapid drop in bleed air pressure, a slight vibration in the flight deck floor, and the sound of rushing air during the bleed air check. To verify that the bleed air valve to the radome is stuck open, go to the nose wheel well and listen for the sound of rushing air coming from the upper right area of the wheel well. If the valve is verified open, proceed as follows:

12.45.2. Ensure the Radome Anti-Icing Switch is Off.

12.45.3. Allow all bleed air pressure to deplete from the manifold.

12.45.4. Enter the nose wheel well and tap the Radome Anti-icing shutoff valve with a mallet.

12.45.5. Perform a bleed air check to determine if the valve closed.

12.45.6. If the anti-icing valve is still stuck open, isolate the system as follows:

12.45.6.1. Deplete all system bleed air pressure.

12.45.6.2. Enter the nose wheel well and, on the right side, just forward of and above the Radar TR unit, locate the bleed air filter (see **Figure 12.11.**).

12.45.6.3. Follow the line attached to the bottom of the filter until it reaches the "T" fitting. Remove the cap, opposite the line, from the "T" fitting.

12.45.6.4. Remove the line from the bottom of the filter and replace it with the cap, which you removed from the "T" fitting in the previous step. This will isolate the radome anti-icing system.

12.45.6.5. Perform a bleed air check to insure the isolation was successful.

Table 12.1. Hostile Environment Repair Kit Parts List.

HOSTILE ENVIRONMENT REPAIR KIT INVENTORY LIST

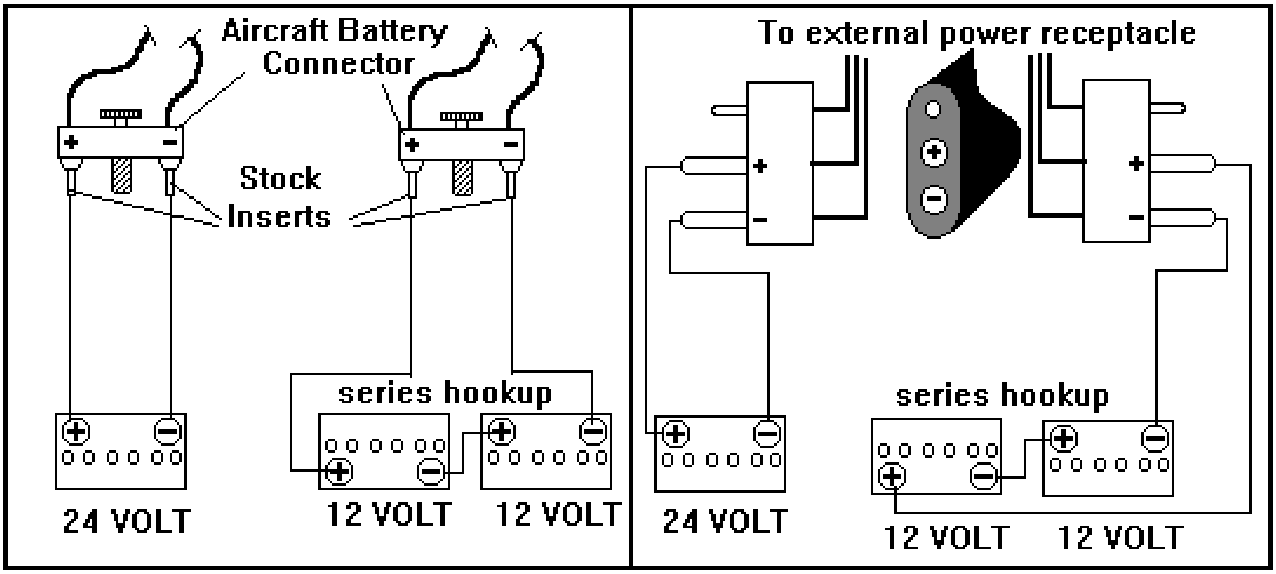
NOTE: STOCK NUMBERS MAY CHANGE WITHOUT NOTICE. NUMBERS SHOULD BE VERIFIED WITH SUPPLY ORGANIZATIONS WHEN ORDERING.

ITEM	STOCK NUMBER
1. ELECTRICAL TAPE	5970004194291
2. VISE GRIP PLIERS, 8 1/2" (2 EA.)	5120004941911
3. ALLEN WRENCH, 5/32 , 6 point (long)	5120001985413
4. CHANNEL LOCK PLIERS, 10"	5120002780352
5. GENEVA LOCK WRENCH	5120007158467
6. STARTER WRENCH	5120006843605
7. SMALL BLADE COMMON SCREWDRIVER	5120002363127
8. IGNITION RELAY CANNON PLUG	5935000139655
9. SPEED SWITCH CANNON PLUG	5935012309542
10. BRAKE SHUTTLE VALVE PLUG , #6 MS (2 EA.)	4730002033709
11. BRAKE PLUG, #8 MS (2 EA.)	4730002028341
12. BRAKE LINE CAP, #8 (2 EA)	4730002898634
13. PIG REPAIR PUTTY (REPLACES OYLTYTE)	8030012652895
14. WIRE BUNDLE TIES (20)	5975010132742
15. WOOD PLUG (LARGE)	5510002559492
16. WOOD PLUG (SMALL)	5510002559493
17. BRASS BAR 7/16 (STOCK BY FOOT) (Cut two 4 inch lengths per kit)	9530002289235
18. BRASS BAR 3/8 (STOCK BY FOOT) (Cut two 4 inch lengths per kit) (Use with Maintenance Free Battery)	9530002289234
19. BRASS BAR 5/16 (STOCK BY FOOT) (Cut one 2 inch length per kit)	9525002289233
20. #10 GAUGE WIRE WITH ALLIGATOR CLAMPS A. 16 INCH WIRE (ORDER BY FOOT) B. ALLIGATOR CLAMPS (PACK OF 6 EA.)	 6145006006051 5999002045206
21. #16 GAUGE JUMPER WIRE WITH TERMINALS (2 EA.) A. 7 INCH WIRE (ORDER BY FOOT) *B. PINS FROM SPEED SWITCH CANNON PLUG	 6145000138651 5935012309542
22. #4 GAUGE JUMPER WIRE WITH TERMINALS (18 INCHES LONG) A. WIRE (ORDER BY FOOT) B. 3/8 INCH TERMINALS	 6154007563030 5940005574338
23. #16 GAUGE JUMPER WIRE WITH TERMINALS (10 INCHES LONG) A. WIRE (ORDER BY FOOT) B. TERMINALS #10 (PACK OF 50 EACH)	 6145000138651 59400014347780
24. OVERSPEED SELENOID VALVE CAP, #4 (1 EA)	4730002785006
25. OVERSPEED SELENOID VALVE PLUG, #4 (1 EA)	4730005424994
26. #10 WIRE AND CANNON PLUGS WIRED TO BYPASS BSU (12 INCHES LONG) A. #10 WIRE B. CONNECTOR C. CONNECTOR	 6145006006051 5935011865487 5935011686755
**27. APU DUMMY ACTUATOR ROD A. BEARING END APU ACTUATOR ROD B. NUT, APU ACTUATOR ROD END	 3120001071678 5310008810944

* The cannon plug must be ordered and the pins removed from the plug for use. Each cannon plug contains six pins.

** The APU dummy actuator rod must be locally manufactured IAW T.O. 1C-130H-2-4, Figure 12-5.

Figure 12.1. Alternate DC Power Connections.



OPTION ONE **OPTION TWO**

Figure 12.2. Reverse Current Relay.

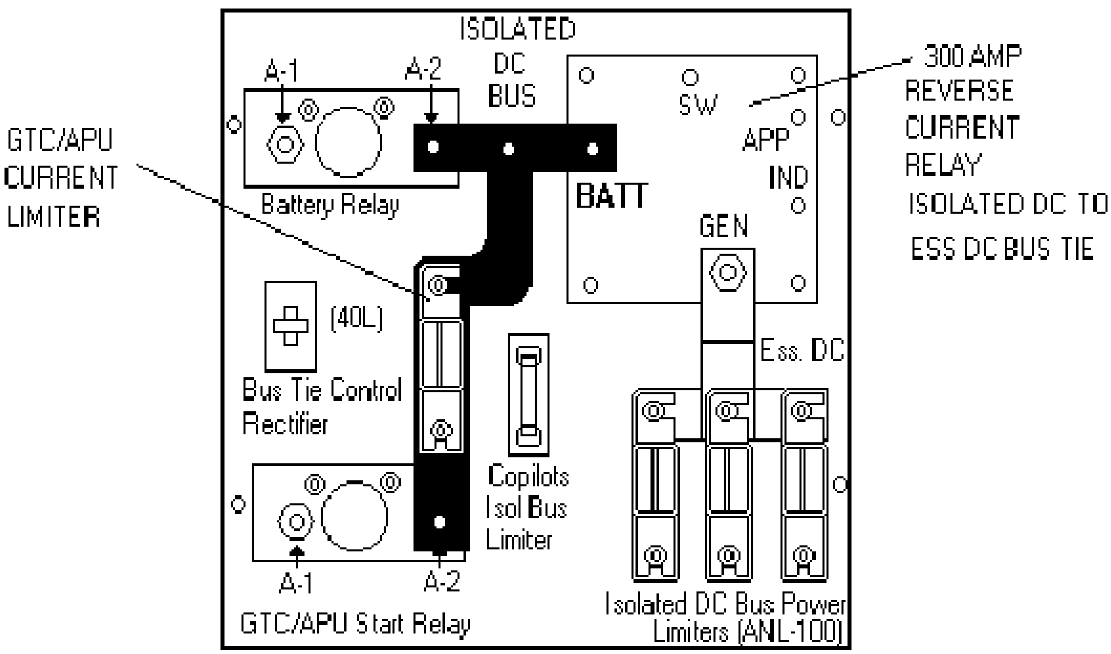


Figure 12.3. Gas Turbine Compressor.

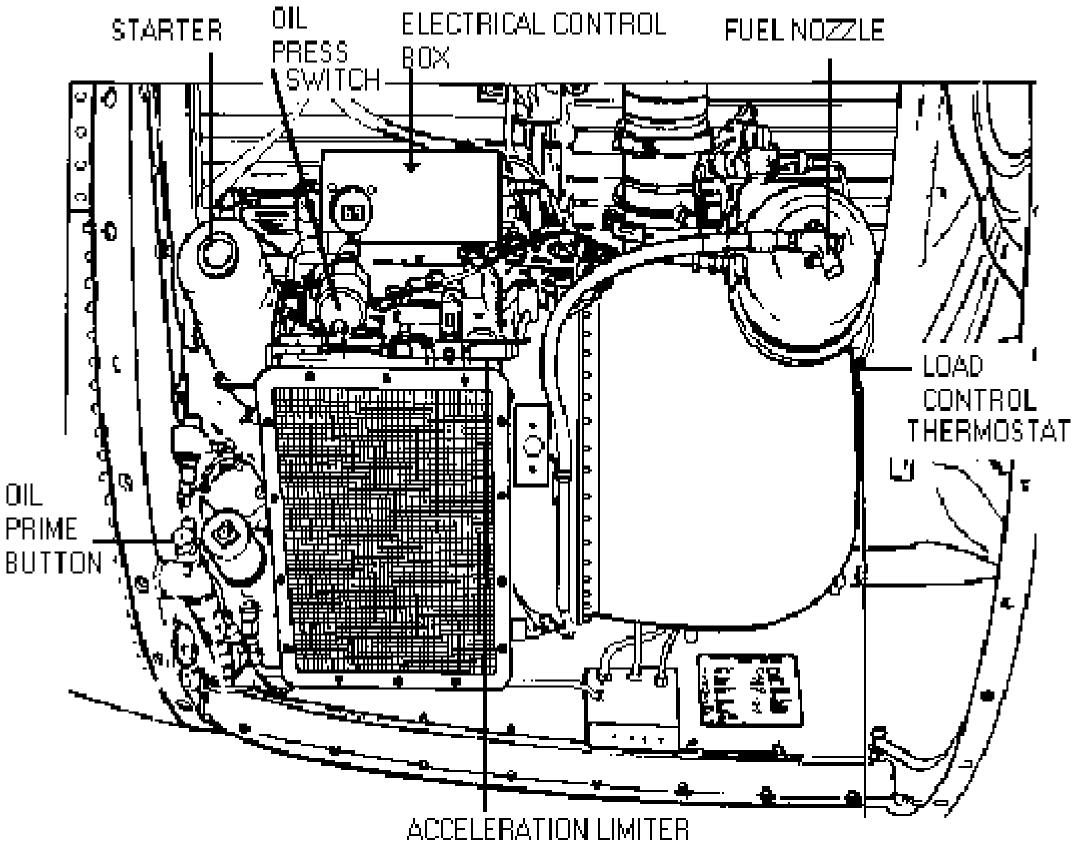


Figure 12.4. GTC Fuel Supply.

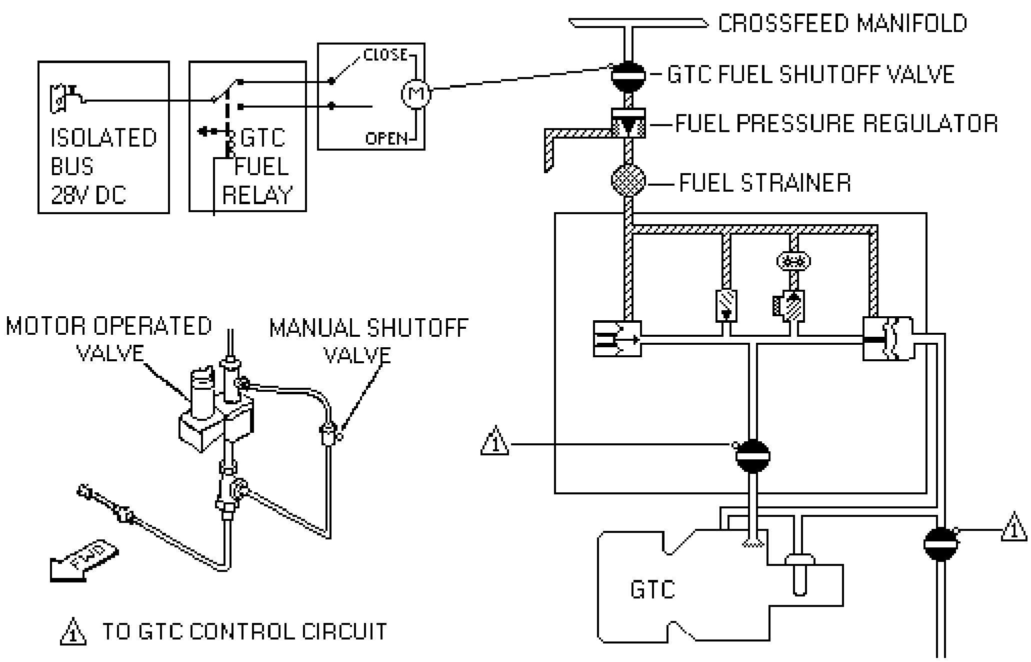


Figure 12.5. APU (Right Side View).

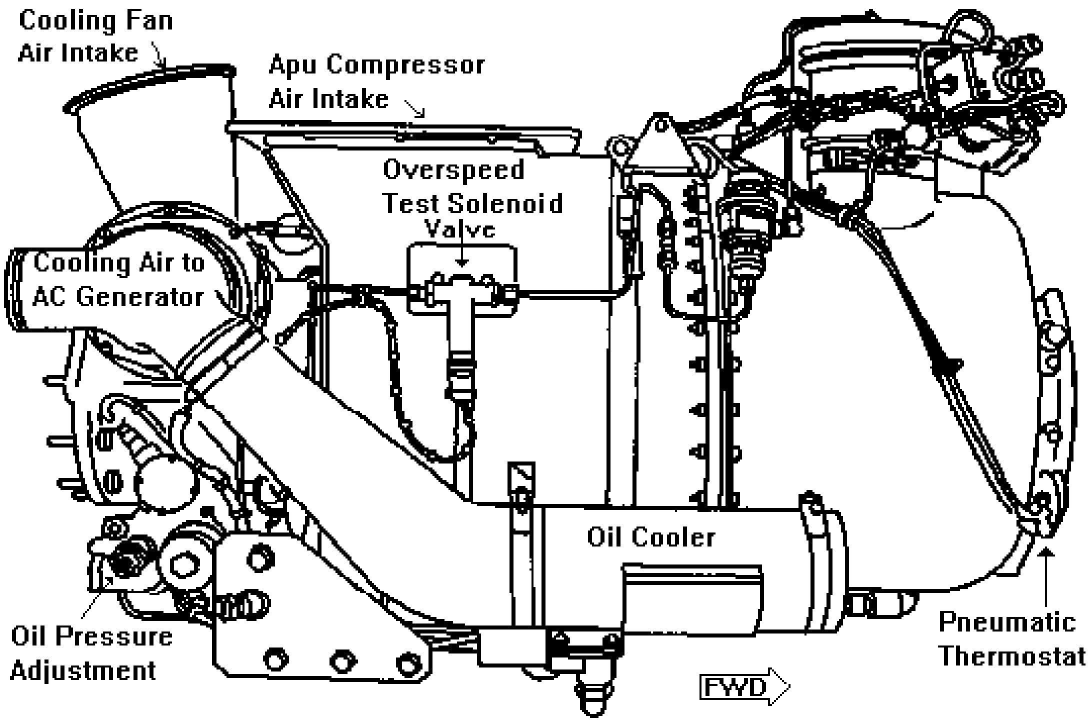


Figure 12.6. APU (Left Side View).

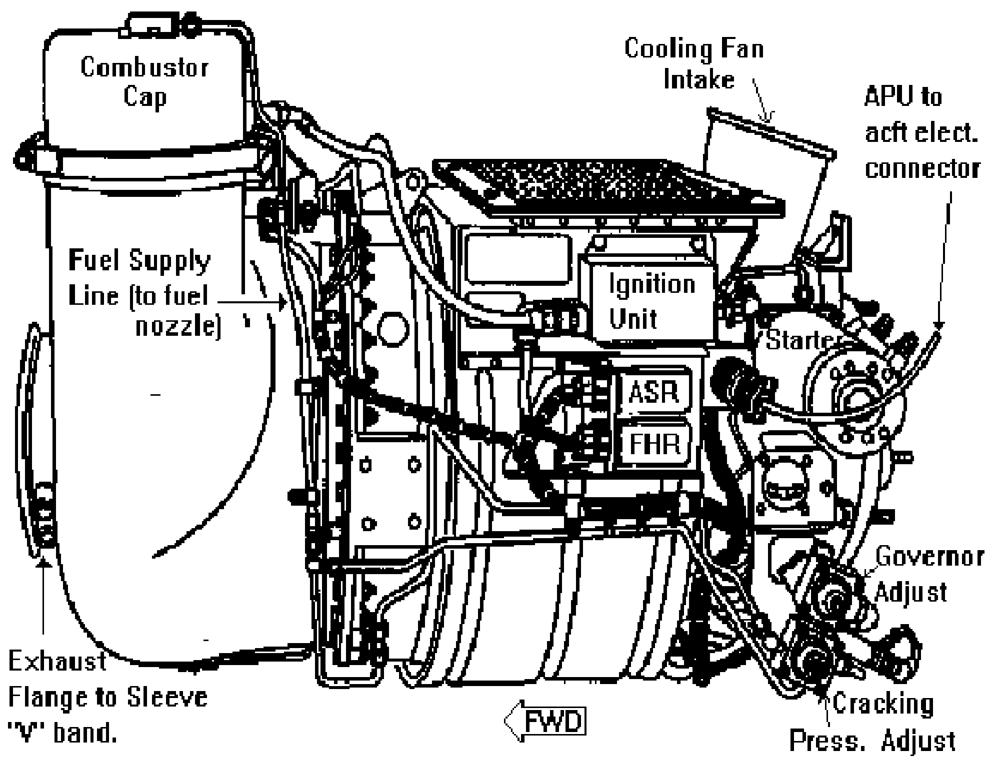


Figure 12.7. APU Inlet Door Assembly.

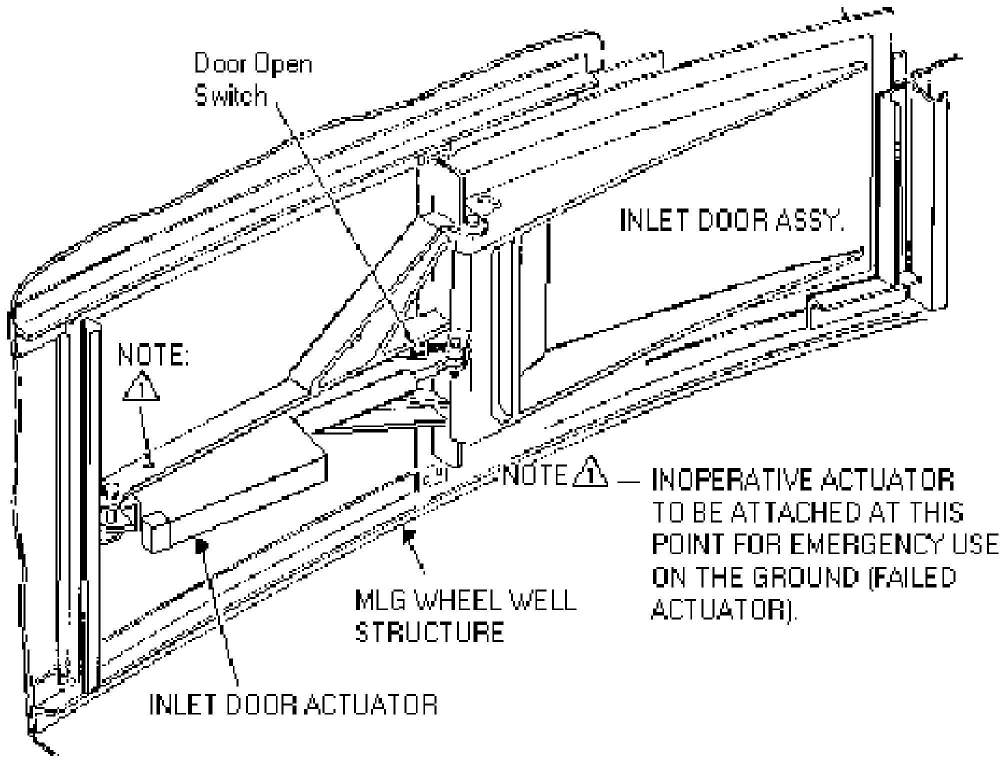


Figure 12.8. Engine Accessory Locations.

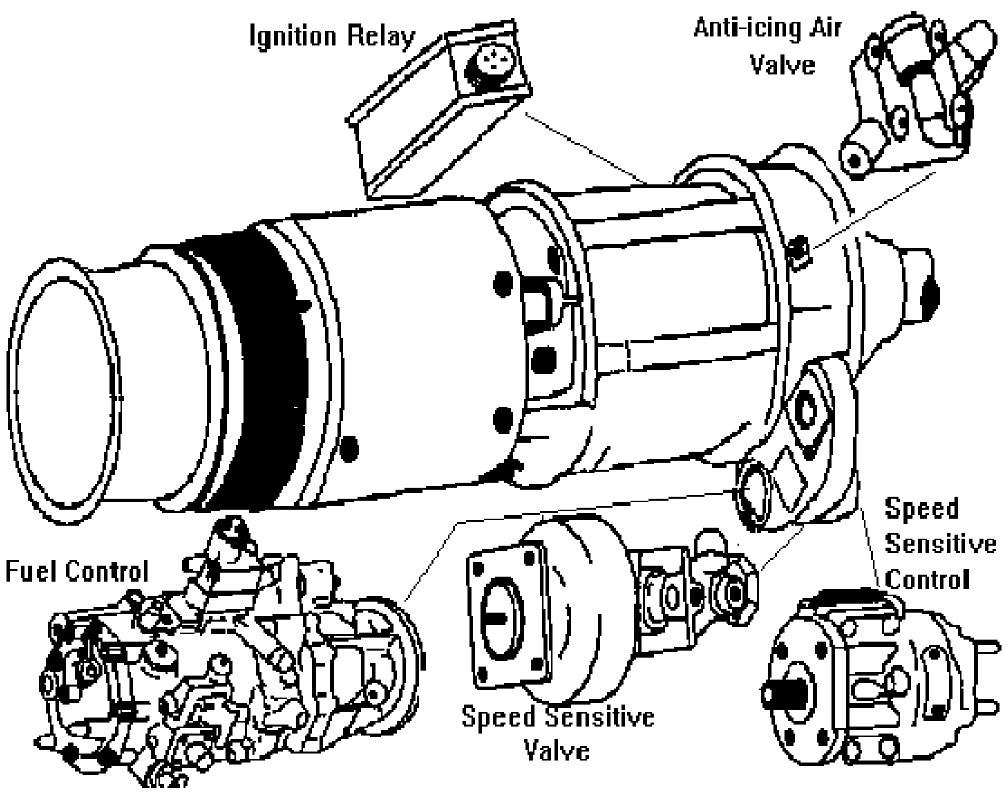


Figure 12.9. Gear Box Accessory Locations.

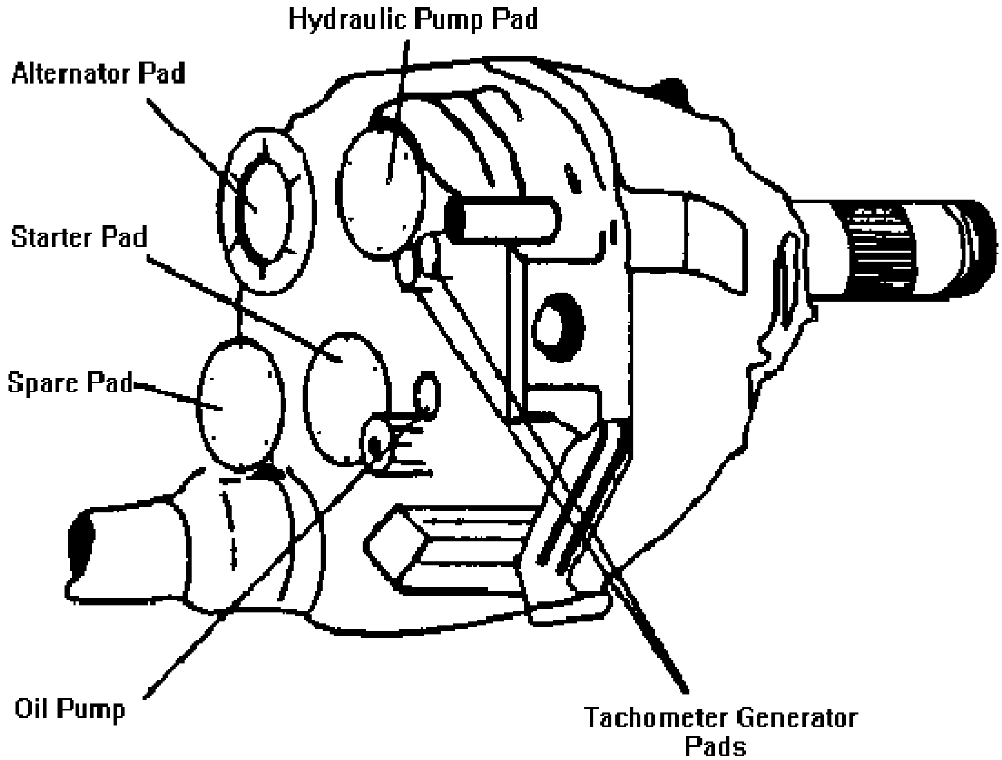


Figure 12.10. Prewired Cannon Plugs (Speed Sensitive Control and Ignition Relay).

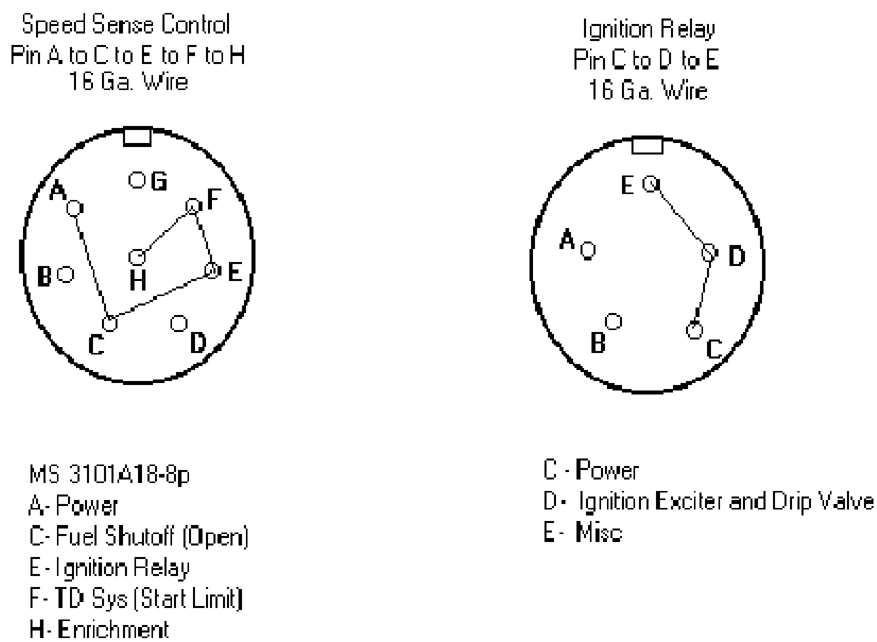


Figure 12.11. Nose Radome Isolation.

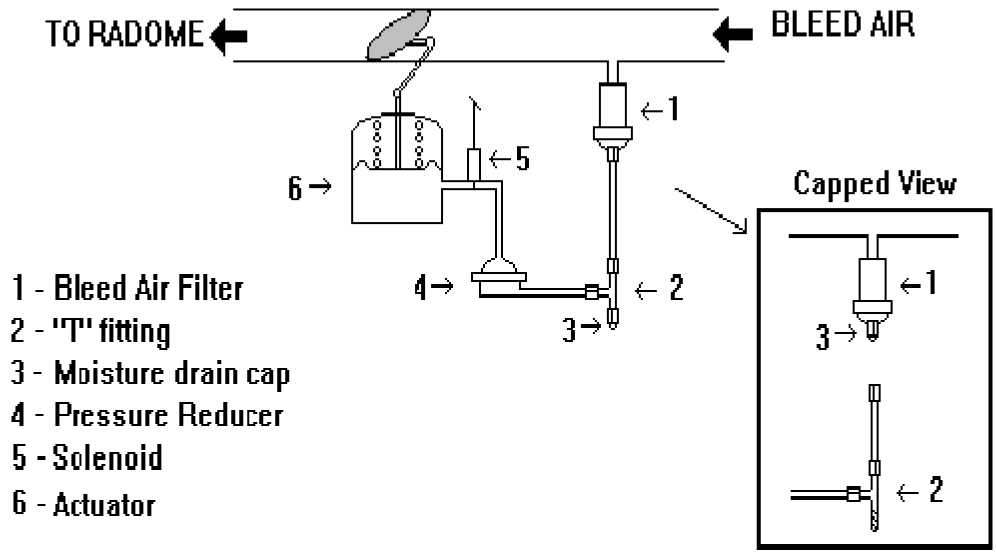
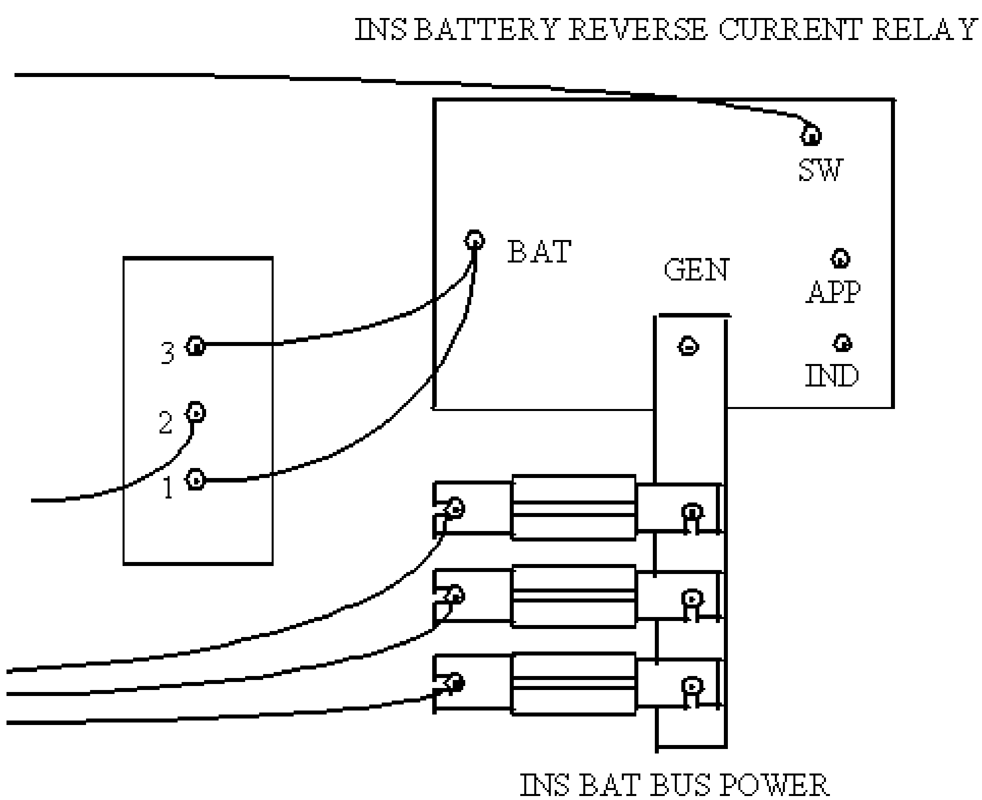


Figure 12.12. Bypassing the INS Reverse Current Relay.



Chapter 13

LOADMASTER PROCEDURES AND FORMS

13.1. General. The loadmaster coordinates loading and offloading with air terminal operations or the shipping agency; plans loads; provides in-flight services to passengers; prepares and rigs equipment for airdrop; and supervises onloading or offloading operations. Participates in the aerial delivery of equipment, supplies, and personnel.

13.2. Responsibilities of Aircraft Loading.

13.2.1. AMC Designated Stations.

13.2.1.1. Air freight personnel are responsible for selecting cargo and mail for airlift, promptly completing documentation, palletizing cargo, load planning, computing load distribution, and movement of cargo to and from the aircraft to meet scheduled departure. They will advise the loadmaster of destination, size, weight, and type of cargo (classified, hazardous, etc.) before starting load operation to permit proper positioning. They will also coordinate traffic activities that may affect loading and off-loading and assign sufficient air freight loading personnel for cargo handling. They are responsible for safe positioning of material handling equipment to or from the aircraft cargo door, ramp, or auxiliary ground loading ramps. Under supervision of the loadmaster, air freight personnel prepare the aircraft for loading (or stow loading/tiedown equipment if the aircraft is not to be reloaded), physically load the aircraft, tie down cargo and equipment, release tie-down, and physically off-load cargo.

13.2.1.2. The loadmaster is responsible for aircraft preflight, load planning oversized cargo and other cargo, preparation of DD Form 365-4, **Weight and Balance Clearance Form F-Transport/ Tactical**, certifying load plans; operating aircraft loading equipment; supervising and directing loading, off-loading, and tie down; and coordinating with loading crew supervisor for checking the cargo against manifests. The loadmaster supervises loading operations and is responsible for safe movement of cargo into and out of the aircraft. Should cargo, aircraft equipment, or aircraft structure be damaged during loading or off-loading, or should loading personnel be injured, the loadmaster will notify the AC, the command post, or the terminal operations officer. The loadmaster will brief the AC on any hazardous cargo and cargo jettisonability prior to engine start.

13.2.1.3. Loads planned by qualified load planners will be accepted by the aircraft loadmaster and loaded aboard the aircraft as planned, unless the load or any portion of it will compromise flight safety or does not comply with aircraft T.O.s (i.e., CG out of limits), or Air Force/MAJCOM publications. If cargo is refused or rearranged for these reasons, notify MAJCOM (HQ AMC/DOV use AMC Form 54) and include a copy of the load plan.

13.2.1.4. The loadmasters are the on-scene experts for load planning and accepting cargo for airlift. Some loads are not specifically detailed in applicable directives and require the loadmaster to use best judgment, based on training, experience, and knowledge, to determine the best and safest method of loading the cargo. When difficulties arise, they should seek advice of other personnel (i.e., available loadmasters, squadron, group, wing, NAF, or MAJCOM Standardization personnel).

13.2.2. At locations without AMC air terminal or traffic personnel, the shipper assumes responsibilities according to paragraph **13.2.1.1.** and provides sufficient qualified personnel and material handling equipment for loading or off-loading. Loadmaster responsibilities and authority are the same as described in paragraph **13.2.1.2.** and paragraph **13.2.1.3.**.

13.2.3. During JA/ATT, SAAM, contingency, and USAF mobility missions, the loadmaster can accept DD Form 2133, Joint Airlift Inspection Record, as a valid pre-inspection of equipment being offered for air shipment. The use of this form, validated by two joint inspection signatures (user and transporting force), may be used in lieu of the applicable portions of the T.O. 1C-130A-9CL-1. The DD Form 2133 will not be used to document preparation of hazardous materials. This will be accomplished using the Shipper's Declaration for Dangerous Goods.

13.3. Emergency Exits and Safety Aisles. Safety aisles will be according to AFI 11-2C-130V3, Addenda A and this instruction.

13.3.1. When passengers are seated in side facing seats, the loadmaster will ensure there is sufficient space between the cargo and the seats to permit passenger legroom.

NOTE: All passenger hand-carried items must be of a size to fit under the seat and must not obstruct the safety aisle. Any items that do not fit under a seat or obstruct an aisleway will be stowed with checked baggage and secured for flight.

13.3.2. At least one unobstructed emergency exit is available for each 20 passengers/troops. (This does not restrict overwater flights if the three overhead escape hatches are available for egress.) Litters and seats erected across an emergency exit are not considered as an obstruction.

13.3.3. When the load consists of palletized netted cargo or is secured with straps, a 30-inch space will be maintained between the cargo and the nearest forward litter, occupied seat or nuclear cargo. When the cargo, either palletized or non-palletized, is secured with chains, the 30-inch spacing is not required. **EXCEPTION:** Maintain 30 inch spacing on Aeromedical Evacuation (AE) missions, when carrying litters.

13.4. Preflight Duties.

13.4.1. Cargo Missions.

13.4.1.1. Aircraft loadmasters in coordination with aerial port personnel establish loading times. Loading times that differ from the normal pre-departure sequence will be established before the loadmaster enters crew rest. Loading time is governed by the type of load and complexity of loading procedures (bulk, palletized, etc.) not by port saturation or management of aerial port workload levels.

13.4.1.2. Proper cargo documentation must accompany each load. A consolidated statement (manifest) will be delivered to the aircraft prior to departure unless one is not available due to a lack or failure of the manifest processing equipment. In this case, a cargo listing or floppy disks containing manifest information must accompany the load.

13.4.1.3. Make every effort to exchange tie-down equipment on a one-for-one basis. If this is not possible, annotate the AF Form 4069, **Tiedown Equipment Checklist**. At non-AMC stations, 463L pallets will normally be exchanged on a one-for-one basis.

13.4.2. Passenger Missions. Maximize seat availability on all missions. It may be necessary for crews to perform passenger service functions at stations that do not have this capability. These functions include manifesting, anti-hijacking processing, and ensuring visa/passport requirements are met. Do not hesitate to contact TACC/APCC, DSN 576-1755/1758, commercial 618-256-1755/1758, if any questions arise such as to who may travel to specific locations or passport/visa requirements. Aircraft operating within other MAJCOMs which have operational command and control over that aircraft will contact the appropriate AMOCC for specific details. File a copy of the passenger manifest with the most responsible on-scene agency if there is no base operations, or other agency responsible for filing the manifest.

13.4.2.1. Ensure all food items are removed from the aircraft by fleet and returned to the in-flight kitchen if an extended delay occurs. Ensure that a copy of AF Form 129, **Tally In-Out**, is received from fleet to relieve the loadmaster of meal accountability.

13.4.2.2. Complimentary snacks and beverages are authorized on Transportation Working Capital Fund (TWCF) funded missions (including ANG and AFRC flown missions) for passenger consumption only. Complimentary snacks are not authorized on JA/ATT, Joint Chief of Staff (JCS) exercises, or special assignment airlift missions (SAAMs). The squadron or port operations officer will ensure snacks and beverages are placed on board when departing AMC stations. When departing from other stations and no snacks or beverages are to be placed onboard, the loadmaster may obtain required snacks and beverages from the local in-flight kitchen. Direct the in-flight kitchen to bill the accounting and finance office at the aircraft's home station. Record all unused snacks and beverages on AF Form 129 and return to the in-flight kitchen for turn-in credit.

13.4.2.3. Ensure the auxiliary power unit/gas turbine compressor is shut down before boarding passengers unless adequate ear protection is provided. A passenger service representative or crew member will assist passengers at the bottom of the steps, and the loadmaster will assist in seating passengers. Ensure that only adult, English-speaking passengers are seated next to emergency exits. Do not seat mothers with infants, children under 15 years old or physically challenged persons in seats adjacent to emergency exits. Make every effort to seat families together.

13.4.2.4. Passengers may hand-carry Department of Transportation-approved infant car seats (ICS). These seats will be secured to a seat using the seat belt. Adults will not hold infant seats during any phase of flight.

13.4.2.5. When children under the age of two are accepted as passengers, their sponsor must provide their own approved ICS. If the mission aircraft is equipped with aft facing "airline style seats" no further action is required. However, if the aircraft is configured with sidefacing seats crews must ensure that the ICS is adequately secured. The design of the sidewall seatbelt makes it difficult to remove enough slack to secure the ICS. Crewmembers may need to reroute the seatbelt by crossing the belt, between the sidewall and the seatback webbing, routing the belt back through the webbing and through the securing point on the ICS. When removing slack from the seatbelt ensure the buckle remains on one side or the other so that it can be easily accessed for release. If in the opinion of the AC the ICS cannot be adequately secured the passenger and the car seat will not be transported on that mission.

13.4.2.6. Download the baggage of no-show passengers and those removed from a flight. In the case of SAAMs or exercise missions at non-AMC locations, coordinate with tanker airlift control elements or deploying unit commanders to decide if the downloading of baggage is necessary.

13.5. Passenger Handling.

13.5.1. The loadmaster is the key figure for good passenger relations. There are certain rules that should be observed:

13.5.1.1. Address passengers by proper titles.

13.5.1.2. Avoid arguments and controversial subjects, national or international politics, criticism of other personnel or organizations.

13.5.1.3. Offer services or perform duties in a manner indicating a personal interest and willingness to help.

13.5.2. Comments by the loadmaster and the manner in which they are made often determine passenger attitudes about the flight. Always remember that passengers are individuals; address them collectively only when making announcements.

13.5.3. In-flight Procedures.

13.5.3.1. Passengers may move about the cabin after reaching cruise altitude; however, judgment must be exercised on the number of passengers allowed out of their seats at any one time. Encourage passengers to remain seated with their seat belts fastened. Due to concern for their safety, passengers are not allowed to lounge or sleep on cargo or baggage.

13.5.3.2. Make frequent checks on the following:

13.5.3.2.1. Cabin temperature.

13.5.3.2.2. Passengers with small children.

13.5.3.2.3. Cleanliness of the cabin and lavatories.

13.5.3.3. Do not allow passengers to tamper with emergency equipment. Passengers will not be permitted access to checked baggage.

13.5.3.4. On long flights, particularly during hours of darkness, use all possible means to make passengers comfortable. Dim and extinguish unnecessary compartment lights.

13.5.3.5. Passengers may visit the flight deck only when approved by the AC. Use good judgment when requesting this authority.

13.5.3.6. Sponsors must accompany children under 15 at all times during the flight.

13.5.3.7. When passengers are carried, a loadmaster will be in the cargo compartment for all takeoffs and landings. When more than 40 passengers are scheduled to be carried (except during unit moves or contingencies), two loadmasters or one loadmaster and another qualified crewmember will be in the cargo compartment. Both crewmembers must remain in the cargo compartment, one forward and one aft for takeoffs and landings.

13.5.4. Meal Service:

13.5.4.1. Meals are served at normal hours when practical, based on the local time at point of departure. Avoid waking passengers to offer meals. Ask the AC about expected flight conditions prior to meal preparation.

13.5.4.2. Passengers who have boarding passes (AMC 148 Form), **Boarding/Pass Ticket**, that show a meal was ordered) are served meals in the following sequence:

13.5.4.2.1. Small children requiring assistance.

13.5.4.2.2. Distinguished Visitors (DV).

13.5.4.2.3. All other passengers.

13.5.4.3. Use the following procedures for box lunches:

13.5.4.3.1. After takeoff, distribute box lunches to passengers who boarded at the previous station. This lessens confusion when flight segments are short and passengers board at subsequent stations.

13.5.4.3.2. Ensure each passenger receives the meal ordered by verifying the passenger's boarding pass.

13.5.4.4. Do not serve liquids or hot food during turbulence.

13.5.4.5. Turn in all meals unfit for consumption to the first in-flight kitchen. If in radio contact with the issuing station, relay aircraft tail number, mission identifier, number of spoiled meals (by menu), issuing organization, and in the case of frozen meals, the manufacturing agency, and manufacturer's lot number.

13.5.4.6. When prepared meals have not been furnished to passengers, the loadmaster will annotate the individual's boarding pass to reflect reimbursement is authorized. Inform passengers they may receive refunds at the next station or the originating or destination terminal.

NOTE: The aircraft commander or his representative must certify the boarding pass for meal refund.

13.6. Not Used.

13.7. Enroute and Post Flight Duties.

13.7.1. At stations where a crew change is made and loading or off-loading is required, the inbound loadmaster is responsible for off-loading the aircraft. The outbound loadmaster is responsible for planning and loading the outbound load. When no crew change occurs, the inbound loadmaster is responsible for on-loading or off-loading cargo.

13.7.2. At crew stage points, brief relief personnel about passenger and aircraft equipment, any missing items, the location of through cargo, mail and baggage, and any information pertinent to through passengers. Point out cargo requiring special consideration (hazardous material, perishables, etc.).

13.7.3. Assist passengers to deplane. If BLUE BARKS, DVs, COIN ASSIST, or couriers are aboard, the loadmaster will inform the protocol or traffic representative respectively.

13.8. Loaded Weapons. Weapons are considered loaded if a magazine or clip is installed in the weapon. This applies even though the clip or magazine is empty.

13.8.1. Personnel who will engage an enemy force immediately on arrival (actual combat) may carry basic combat loads on their person. Weapons will remain clear with magazines or clips removed until immediately prior to exiting the aircraft. The troop commander will coordinate with the loadmaster(s) prior to directing personnel to load any weapons. This applies to airborne assaults and airland missions.

13.8.2. Personnel who will not immediately engage an enemy force will store basic ammunition loads in a centralized location for redistribution on arrival at the objective. Magazines or clips will not be inserted into weapons.

13.9. Cargo Validation On-loading and Off-loading Procedures. In order to assist in the cargo validation process, use the cargo validation on-loading and off-loading format in attachment 13.A.1. Use this format when tasked to validate a new loading procedure or when encountering any cargo that you feel requires special or specific on-loading, off-loading or tie-down procedures that are not currently listed in T.O. 1C-130A-9. After completion, send through standardization channels to HQ AMC/DOV.

13.10. Border Clearance. Certain forms for border clearance are required by Customs, Immigration, and Agriculture. The loadmaster will ensure all required forms are aboard the aircraft before takeoff. Distribute the forms to the crew to ensure completion before landing and deliver to the proper persons at enroute and terminating stations.

NOTE: Ensure sufficient customs forms are available for each passenger. The forms should be provided by passenger service personnel prior to departure.

13.11. Operational Forms for Loadmasters. Detailed instructions on the preparation, distribution, and use of the following forms may be found in the governing directive (where noted).

13.11.1. DD Form 2131, **Passenger Manifest** (AMCI 24-101V14).

13.11.2. DD Form 1385, **Cargo Manifest** (DOD 4500.32R).

13.11.3. DD Form 1854, **US Customs Accompanied Baggage Declaration** (DOD 5030.49R).

13.11.4. DD Form 1907, **Signature and Talley Record** (DOD 4500.32R).

13.11.5. CF 6059B, **US Customs Accompanied Baggage Declaration**.

13.11.6. CF 7507, **General Declaration (Outbound/Inbound)** (AFI 24-401,402,403, and 404).

13.11.7. I-94, **Immigration Form, Arrival/Departure Record** (AFI 24-401,402,403,404).

13.11.8. AF Form 4069, **Tiedown Equipment Checklist**.

13.11.9. AMC Form 148, **Boarding Pass/Ticket/Receipt**.

13.11.10. AF Form 4075, **Aircraft Load Data Worksheet**. Used for each leg of a cargo mission to keep track of each load and aid when calling in load information to the off-load base.

13.12. Weight and Balance. Accomplish weight and balance for this airplane according to T.O. 1-1B-50, *Weight and Balance*, and AFI 11-2C-130V3, AA, *C-130 Configuration/Mission Planning.* The unit possessing the airplane maintains the primary weight and balance handbook containing the current airplane status and provides a supplemental weight and balance handbook for each airplane. Enclose the supplemental handbook in a wear-resistant binder (preferably metal), stenciled "Weight and Balance" with the airplane model and complete serial number on the cover or spine.

13.12.1. The supplemental handbook will include TO 1C-130X-5, AFI 11-2C-130V3 AA, and sufficient copies of DD Form 365-4 to complete the mission and a certified copy of the current DD Form 365-3, **Chart C-Basic Weight and Balance Record**. Chart C will include the airplane's basic weight, basic moment, and center of gravity.

13.12.2. The weight and balance section of the unit possessing the airplane will provide the information required to maintain documents current and accurate to the appropriate agency.

13.12.3. Obtain the total fuel weight from the flight engineer or read directly from each gauge and compute the sum for total fuel weight. Do not rely on the fuel totalizer gauge.

13.12.4. Loadmasters, in units who authorize the use of Canned Forms F, will still compute and provide the Flight Engineer with an accurate operating weight.

13.13. Format for Validation of Cargo On-Loading and Off-Loading Procedures. Use the following format when tasked to validate a new piece of equipment or encountering any cargo requiring special or specific on-loading and off-loading procedures.

13.13.1. General Loading Data:

13.13.1.1. Nomenclature of item. Give military or civilian name, national stock number (NSN), and a brief description of the item, i.e. dump truck, medical van, etc.

13.13.1.2. Dimensions (in inches): Length, width, and height. Rough drawing or picture of the unit, pointing out critical dimensions, projections, overhangs, etc.

13.13.1.3. Weight (in pounds): Gross weight; Individual axle weight; or Data plate weight if possible.

13.13.2. Crew - Number of loading crew personnel and loadmasters required to on-load or off-load cargo and their required position to observe clearance, if required.

13.13.3. Equipment and Material Requirements - Special equipment and material required to on-load and off-load cargo, i.e. cargo winch, prime mover, shoring requirements.

13.13.4. Aircraft Configuration Required.

13.13.5. Preparation of Cargo for Loading - Helicopter struts, components that must be removed, etc.

13.13.6. Loading Procedures.

13.13.7. Tie Down Points.

13.13.8. Off-loading Procedures.

13.13.9. Comments.

Chapter 14

FUEL PLANNING

14.1. General. This chapter provides general fuel planning considerations and procedures. Publish local procedures in **Chapter 10**.

14.2. Fuel Conservation.

14.2.1. Conservation of fuel requires everyone's active participation. Do not carry extra fuel for convenience. Unidentified extra fuel should not exceed required ramp fuel load (RRFL) by more than 2,200 pounds.

14.2.2. Extra fuel (identified extra) may be added to RRFL:

14.2.2.1. When fuel availability is limited or not available at enroute stops.

14.2.2.2. For known holding delays in excess of standard.

14.2.2.3. For anticipated off course weather avoidance.

14.2.3. Planning guidelines for fuel conservation:

14.2.3.1. Use optimized CFPs when possible.

14.2.3.2. Long range cruise (LRC) and/or optimum altitude should be flown (when possible).

14.2.3.3. Limit the use of the APU/GTC when possible.

14.2.3.4. Delay engine start.

14.2.3.5. Cruise CG should be aft if practical.

14.2.3.6. Fly enroute descents when possible.

14.2.4. Fuel loads:

14.2.4.1. Use the appropriate fuel planning publication for your aircraft or the appropriate T.O. 1C-130-1-1 for fuel planning. Use 100 percent engine or constant altitude performance charts. With the exception of those items explained in Paragraphs **14.2.5.** and 14.2.5. fourth bullet, all items of the fuel analysis portion of AF Form 4116, **C-130 Flight Plan and Record**, are explained in **Table 14.1.**. ANG and AFRC OG/CC may establish standard ramp fuel loads for C-130 aircraft home station departures.

14.2.5. If fuel is computed using the fuel planning instruction, make the following corrections for drag caused by the rough paint and the SKE radome:

14.2.5.1. Decrease highest acceptable flight level and computed cruise ceiling by 800-feet.

14.2.5.2. For cruise (280, 290, or 300 KTAS), add 800 pounds to enroute fuel for enroute times between zero and four hours. Add 1,600 pounds to enroute fuel for enroute times between four and eight hours. Add 2,000 pounds to enroute fuel for enroute times over eight hours.

14.2.5.3. When computing preflight endurance, always subtract an additional 1,300 pounds, regardless of enroute TAS. Prior to computing preflight/in-flight endurance (280, 290, or 300 KTAS), subtract the following from ramp fuel/fuel remaining: up to 18,000 pounds remaining, subtract 800 pounds; 18,001 to 36,000 pounds remaining, subtract 1,600 pounds; more than 36,000 pounds remaining, subtract 2,000 pounds.

14.2.5.4. If fuel is computed using T.O. 1C-130X-1-1, use the appropriate drag index. If the T.O. 1C-130X-1-1 is used with the appropriate drag index, Do not add 800, 1600, or 2000 lbs. to enroute fuel.

14.3. Fuel Planning.

NOTE: See **Attachment 2** or paragraph **14.2.5.** for fuel planning corrections.

14.3.1. Entering Arguments:

14.3.1.1. Weight. Add OPERATING WT, CARGO/ PAX WT, and RAMP FUEL to obtain RAMP WT. Subtract TAXI fuel (item 9 on the AF Form 4116) to obtain TAKEOFF WT.

14.3.1.2. TEMP DEV - Temperature Deviation. Compare the forecast temperature at cruise altitude to the standard temperature for that altitude. The algebraic difference is TEMP DEV.

14.3.2. Refer to Fuel Planning guidance in paragraph **14.1.**. for fuel computations on AF Form 4116 and to the appropriate C-130 fuel planning publications listed in **Table 14.2.**.

Table 14.1. Fuel Load Components.

ENROUTE	Fuel for flight time from departure to overhead destination or initial penetration fix at cruise altitude (including time for planned orbit, escort, search, recovery, appropriate climb, weather recon, etc. when applicable).
ENROUTE RESERVE	10% of flight time over a Category I route/segment, not to exceed 45 minutes. For orbit/ search missions, 10% of flight time for that portion with inadequate NAVAIDS from the orbit/search point to destination. Compute at terminal fuel flow.
ALTERNATE AND MISSED APPROACH	**Alternate**: Fuel for flight time from overhead destination or initial penetration fix to alternate, or most distant alternate when two are required. Compute at terminal fuel flow. Required whenever alternate must be filed. **Missed Approach**: 2,200 lbs. Required if destination is below ceiling minimums but above visibility minimums for planned destination approach.
HOLDING	Entry required. Minimum 2,000 lbs. If flight time over a Category II route is greater than 3+20, when an alternate is located in Alaska, alternate not available or located at latitudes greater than 59 degrees N/S, use 3,500 lbs. These holding fuel calculations meet or exceed the fuel requirements of AFI 11-202V3 2.2.3. Fuel Reserves.
APPROACH LANDING	**Approach:** 1,000 lbs (2,000 lbs for high altitude approach). Entry always required. **Minimum Landing Fuel**: 4,000 lbs. Entry always required.
PRESSURIZATION LOSS	Additional fuel for pressure loss at ETP - used when pressurized, carrying passengers, and aircraft oxygen is not available to the passengers. Compute at 1,000 lbs/hr for time from ETP to FSAF or LSAF or “T” time. If computed fuel required for pressurization loss is less than total of items 2, 4, 5, and 12, no additional entry required in item 7. If computed fuel exceeds the total of item 2, 4, 5, and 12, add the difference in item 7.
STORED FUEL	Ramp fuel for succeeding legs without refueling.
OFF-COURSE MANEUVERS	Fuel for anticipated off-course maneuvering for terrain clearance, thunderstorm avoidance, and ATC requirement. Compute at 100 lbs/min for departure, 50 lbs/min enroute.
ICING	500 lbs/hour of anticipated icing.
KNOWN HOLDING DELAYS	Fuel for anticipated/planned excess holding time. Compute at terminal fuel flow.
TAXI AND TAKEOFF	Normally 1,300 lbs. For known taxi delays or additional engine-running ground time in excess of 20 minutes, add 50 lbs/min.

UNIDENTIFIED EXTRA	Difference between ramp and actual ramp fuel. Normally, should not exceed 2200 lbs. (fuel conservation)
MINIMUM DIVERSION	Total of ALTERNATE AND MISSED APPROACH, HOLDING, and APPROACH/LANDING. Will never be less than 7,000 lbs.

Table 14.2. Fuel Planning Publications.

AIRCRAFT MODEL	PUBLICATIONS
C-130B	T.O. 1C-130B-1-1 and AMCPAM 55-15
C-130E	T.O. 1C-130B-1-1 and AMCPAM 55-19
C-130H (73 - Series)	T.O. 1C-130H-1-1 and AMCPAM 55-45
C-130H (74 - Series and Up) C-130(K)H	T.O. 1C-130H-1-1 and AMCPAM 55-46

Chapter 15

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15.1. This chapter is intentionally left blank (Air Refueling).

Chapter 16

COMBAT MISSION PLANNING

16.1. General. Airlift crews must be capable of employing a wide range of tactics when operating in hostile areas. This chapter provides combat mission planning guidance for planners and aircrews, standardizing procedures for planning, briefing, and reviewing all missions. Mission planning is normally conducted the day prior to the mission. Operations group commanders may elect to use a “same day mission plan” option. The aircrew is ultimately responsible for the accuracy of the mission materials. Unit mission planning facilities should possess essential mission planning material.

16.1.1. References. See **Attachment 1**.

16.1.2. Mission Tasking. Combined or joint task force operations, combat contingency operations, or actual combat operations require an alteration of standard peacetime mission tasking procedures. Deployed forces will require both intertheater and intratheater airlift support. A DIRMOBFOR will be assigned to the Air Force Component Commander (AFCC) to help facilitate both types of airlift. The DIRMOBFOR commands the Air Mobility Division (AMD) within the Air Operations Center (AOC) which tasks, plans, and controls all intratheater airlift missions usually performed by units/aircraft which have been "chopped" (change of operational control, normally C-130s) to the theater task force commander. An Air Mobility Element (AME), a deployed unit of the TACC, will be co-located within the AMD and functions as a liaison between the TACC and the theater. The AME coordinates and plans intertheater and direct delivery missions and mission support with theater command and control elements and provides required theater information to TACC for distribution to aircrews. For large formation operations, detailed mission planning may be delegated to participating units and aircrew. Refer to Air Force Doctrine Document (AFDD) 2-6, *Air Mobility*, AFDD 2-6.1, *Airlift Operations*, and AFTTP 3-1, Vol 1 for more specific information.

16.1.3. Concept of Operation. Joint airborne operations will be initiated by a unified or joint force commander (JFC). When an airborne operation is necessary, the JFC ordering the operation furnishes participating units with an initiating directive or OPORD. This directive specifies the missions, outlines the command structure, identifies participating ground and air forces, lists supporting forces, and provides a schedule of events based on the ground tactical plan and available airlift capabilities.

16.1.4. Mission Feasibility Study. Prior to specific tasking and detailed mission planning, a preliminary study must be done to develop mission profiles and determine the potential for mission success. Feasibility studies are usually done at the joint command level but may be delegated as low as the individual aircrew. AFTTP 3-1V25 contains an outline of considerations to help determine if a mission can be executed as requested.

16.1.5. Mission Commander. **Chapter 2** specifies mission commander requirements and qualification criteria. AFTTP 3-1, Vol 1 contains a mission commander's checklist that is intended to assist mission commanders with their duties and responsibilities.

16.1.6. Mission Planning Staff. The planning staff should include, as a minimum, the mission commander, a pilot, a navigator, a loadmaster, and a plans/tactics/intelligence officer. Other staff functions such as weather, airspace management, communications, logistics, aerial port and special tactics may also be required.

16.1.7. Mission Planning Folders (MPF). Combat mission planning folders contain essential operational and intelligence data required to plan, study, and execute airlift operations. MPFs should be developed and used for peacetime training and wartime tasking. They also provide a historical record for subsequent mission planning. AFTTP 3-1V25 contains a standardized MPF format which may be modified to fit specific tasking. Operational uniformity of the MPF will be maintained.

16.2. Mission Planning. The first steps in planning an operation are to analyze the tasking, gather all pertinent information, and decide what additional support is required. Having this information on hand prior to developing the detailed plan will save time in the long run. Planners must thoroughly study enroute threats, terrain, ingress and egress routes, target areas, operations and communications security (OPSEC and COMSEC), political and cultural characteristics, climatology, and any other factors which enhance mission success. Intelligence and meteorology and/or climatology requirements must be identified early because this information may not be readily available. Mission support requests must also be processed as soon as possible to allow coordination and planning. The level of coordination is dependent on available time and means of communication. Aircrews must be ready to operate in the joint arena with little or no face-to-face coordination.

16.2.1. Tasking Order Analysis. The theater AOC will publish an air tasking order (ATO), airspace coordination order (ACO), fragmentary order (FRAG), and/or air movement table (AMT) to establish mission objectives. The AMD of the AOC, headed by the DIRMOBFOR, is responsible for planning and publishing intratheater airlift and air refueling requirements in the ATO. ATO contents are discussed in AFTTP 3-1, Volumes 1 and 25.

16.2.1.1. OPORD. An OPORD usually covers overall concepts of operations and mission requirements to be flown during a future time period (such as a week or more).

16.2.1.2. ATO. An ATO will be issued by the JFAFCC through the AOC. An ATO will task elements of composite forces, provide mission objectives and general guidance, and indicate actions required by individual situations. The AME is responsible for deconflicting intertheater missions with intratheater missions published in the ATO. ATOs are normally accompanied by special instructions (SPINS) which provide detailed instructions for composite forces. A standardized ATO format for theater assigned forces can be found in AFP 102-2V1, *Joint Users Handbook--US Message Text Format* (JUH-USMTF), Air Tasking Order/Confirmation (ATOCONF) and in AFTTP 3-1, Vol 1. Airspace control procedures may be implemented in the ATO, SPINS, or published in a separate Airspace Coordination Order (ACO). Planners and aircrews must understand and comply with all aspects of current airspace control procedures. The following items can be extracted from the ATO:

16.2.1.2.1. Mission number.

16.2.1.2.2. Security classification.

16.2.1.2.3. Tasking organization.

16.2.1.2.4. Concept of operations and mission description to include type of mission, assault zone description, required aircraft and aircrews, and participating forces and units.

16.2.1.2.5. Schedule of events.

16.2.1.2.6. Rules of engagement (ROE).

16.2.1.2.7. Communications & Electronic Operating Instructions (CEOI).

16.2.1.2.8. Special Instructions (SPINS).

16.2.1.2.9. Command and control instructions.

16.2.1.2.10. Scheduled airlift support (e.g., JSEAD, AWACS, ABCCC, CAP, STT).

16.2.1.2.11. Airspace management procedures, to include IFF/squawks, airspace control center coordination (e.g., ALCC, TACS, AAGS, ATAF), air defense network procedures, prohibited/restricted area procedures, and route deconfliction.

16.2.1.3. Air Movement Table (AMT). The DIRMOBFOR's transportation staff should develop an AMT as an appendix to the ATO to list equipment and personnel, which constitute each aircraft load. An abbreviated ATO or FRAG may be issued to subordinate units to further refine the ATO and air movement plan.

16.2.2. Schedule of Events. After receiving formal mission tasking, planners construct a schedule of events checklist to assist in keeping the mission, from planning through execution, on schedule. Some mission events (e.g., TOTs, available CAF availability, etc.) will be specified in the tasking document. AFTTP 3-1, Vols 1 and 25 provide suggested lists of significant mission events.

16.2.3. Intelligence Requirements. Current intelligence is vital. Incomplete or outdated information reduces the probability of success and survivability. Intelligence personnel will be integrated into the planning cell. They can prepare a reference chart depicting current orders of battle (OB) and significant intelligence/threat information. They predict enemy radar detection capabilities, and obtain imagery of enroute or objective area reference points (imagery must be requested early to ensure availability). Targeting specialists can provide radar predictions and target analysis when required.

16.2.4. Meteorology/Climatology Analysis. Weather information will be included in both planning and briefing functions for all missions. The impact of atmospheric and climatic factors depends on the intensity of the condition, the tactics used, and the capability of friendly and enemy forces to operate in degraded weather conditions. Pay particular attention to forecasts of low level winds/turbulence and conditions affecting visibility. AFTTP 3-1, Vol 25 contains an outline for meteorology/climatology analysis.

16.2.5. Mission Support. Planners need to identify, request, and coordinate additional intratheater mission support above that provided in the ATO/SPINS. The point of contact for coordination is the AMD and the DIRMOBFOR staff.

16.2.6. Mission Considerations. There is no single, best solution to any tactical situation. The most important concept in developing tactics is to remain unpredictable. Tactical planning must be ingenious and dynamic, while continuing to use sound tactical concepts developed and tested in the past.

16.2.6.1. Enemy Defenses. Avoiding enemy defenses is a key mission planning factor. The most critical intelligence factors will be the location, capabilities, and limitations of the enemy's order of battle (OB). Detection may provide the enemy enough warning to deny the objective and direct air defense forces against friendly aircraft.

16.2.6.1.1. Detection. Aircraft can be detected by visual, radar, electronic, and noise signatures. Plan the mission at the highest altitudes that deny detection.

16.2.6.1.2. Radar. Perhaps the most critical detection factor for airlift is radar; however, three vulnerabilities can be exploited: maximum theoretical detection range, degraded low-level detection (anti-clutter) capabilities, and the masking properties of an obstruction between the antenna and the aircraft.

16.2.6.1.3. Threat Engagement. AFTTP 3-1, Vol 2, provides classified threat system information. If a mission is likely to encounter a hostile air defense environment, evaluate threat capabilities and limitations with intelligence personnel.

16.2.6.2. Force Requirements. Planners must provide all support elements (CAP, SEAD, etc.) with the general route, timing, and TOT. Defense suppression and counter-air forces can use this information to seek out and engage enemy defense forces that could pose a threat to the mission. Medium-altitude corridor tactics require more dedicated support, jamming support, chaff corridor, and extended counter-air suppression efforts.

16.2.6.3. Navigation. Accurate navigation is crucial. Aircrews must plan to use every resource at their disposal. Carefully evaluate the enemy's capability to detect electronic emissions from the aircraft, and plan to minimize these emissions where feasible. On all missions, dead reckoning, map reading, and position awareness are crucial to low-level navigation.

16.2.6.4. Altitude Selection. The selection of the proper flight altitude is one of the most important decisions for a mission planner. Operations against a sophisticated air defense network usually requires flight at lower altitudes to limit probability of detection and engagement. Lower altitude reduces slant range on small arms and AAA systems and may place trees and hills between the aircraft and the threats. Newer SAM systems are capable of attacking targets well below 300 feet AGL, so aircrews must be prepared to go to a minimum altitude capable (MAC) or coordinate suppression resources to maximize the probability of mission success. In an unsophisticated air defense network having little or no radar coverage, medium or high altitude may be used to avoid small arms, light AAA, and man-portable air defense systems (MANPADS). Plan flight altitudes as high as the threat will allow.

NOTE: The following altitude ranges for low, medium, and high altitude do not correspond to AFTTP terminology.

16.2.6.4.1. Minimum Altitude Capable (MAC). MAC is the lowest altitude an aircrew can descend to when they detect or suspect a threat. It is dependent on individual aircrew capabilities, experience level, fatigue factors, terrain clearance, etc. Since maneuvering and navigation capabilities are virtually negated at MAC, descending to this altitude is only warranted as a defensive response to an engaged threat and only for the duration of immediate threat activity.

16.2.6.4.2. Low Altitude (300 feet to 500 feet AGL). Aircraft flying at 500 feet or below may degrade or eliminate a threat system depending on terrain and distance. For airlift aircraft, this altitude provides optimum terrain clearance for aircraft maneuverability and navigation while countering hostile air defense threat systems. When faced with known threats, every effort must be made to destroy or neutralize them before employing airlift aircraft. Ground controlled intercept (GCI) guided air-to-air engagements will be nearly impossible at low altitudes due to GCI radar limitations and the inability of air interceptors to locate target aircraft and engage air-to-air missiles due to terrain background clutter. Low altitude also reduces an aircraft's IR signature; the lower the altitude, the closer the IR SAM must be to detect the IR radiation. Head-on capabilities of cooled seeker heads are degraded by reducing forward IR signature.

16.2.6.4.3. Middle Altitude (501 feet to 5,000 feet AGL). The middle altitude range is the worst threat environment for airlift aircraft because all threats are effective at these altitudes and evasive maneuvers are usually ineffective.

16.2.6.4.4. High Altitude (above 5,000 feet AGL). The high altitude range may negate the small arms threat and decreases the effectiveness of most AAA; however, it dramatically increases the vulnerability to enemy fighter or radar SAM attack, and places the aircraft in the worst position to begin evasive maneuvers.

16.2.6.5. Day versus Night Operations. Night operations degrade optically sighted threat systems and increase the probability that enemy defenses may be in a lowered state of readiness. The disadvantages to night operations are that navigation may be more difficult and, if night vision goggles are not used, the aircraft may be forced up to an altitude where radar tracking is more likely. Additionally, when selecting employment options, consider moonlight, which may provide sufficient light for optical threat systems, and cockpit/cabin lighting which may increase the probability of acquisition by enemy night vision devices.

16.2.6.6. Rules of Engagement (ROE). The crew must be familiar with the established ROE. CJCSI 3121.10, *Standing Rules of Engagement for US Forces*, applies and may be supplemented for the particular mission. Commanders at all levels may request changes to the ROE through the chain of command. Changes to ROE must be rapidly disseminated to all personnel. The ROE will never limit the inherent right and obligation of individual and unit self-defense. Even if there are no forces declared hostile, commanders will defend their units against a hostile act or hostile intent. The two elements of self-defense are necessity and proportionality. For necessity, a hostile act must occur or there must be a demonstrated intent to commit a hostile act. The threat posed by the hostile act or intent must be imminent. Proportionality infers that the use of force must be reasonable in intensity, duration, and magnitude and must be consistent with the threat to ensure the safety of the force. Individuals will be prepared to act in self-defense. Nothing in the ROE limits crewmember rights to take appropriate action to defend themselves.

16.2.6.7. Command and Control (C2). Combat and contingency missions usually follow a sequence of events, which affect future missions. Completion of drops, landings, and securing airfields are but a few of the events command and control may need to track. Secure communications and anti-jam technology will be used to the maximum extent possible because radio transmissions in a combat zone can compromise the aircraft's position and the operational security of the objective. Missions should be planned to require minimum radio communications within a combat area. Normally, a communications plan or communications and electronic operating instructions (CEOI) will be provided by the user to define communications requirements. In most cases, code words define events and are transmitted when the event occurs or does not occur (through the use of an execution checklist). Radio contact with the drop zone (DZ) should be limited to that required for safety and mission accomplishment (i.e., ATC directions, range clearance, unsafe surface conditions, and mission changes). DZ winds or other information may be broadcast in the blind at pre-coordinated times prior to the scheduled TOT. AFTTP 3-1, Vols 1 and 25 provide guides for C2 considerations during planning.

16.2.6.8. Tactical Deception Planning. Tactical deception can be an effective tool for masking the mobilization, movement or objectives of friendly forces, and protecting them during ingress or egress. Airlift can be solely a beneficiary of the deception or may be tasked to act as part of an overall plan. Effective deception is executed jointly and must be considered early in the operational planning process. Tactical surprise and deception enhances combat capability but will not be a condition for its success. Deception tactics are limited only by the imagination of the planner, the enemy's ability to react to the deception, and available resources. See AFI 11-704, *Air Force Tactical Deception*.

16.2.6.9. Formations. In-trail formation is an effective tactic for putting "mass on the DZ" in a small amount of time, a frequent requirement dictated by the ground tactical situation. This is not to say large formations must be flown enroute since they are less maneuverable and more susceptible to detection and attack by enemy forces. An alternative is to fly smaller serials or single ships enroute and plan to rejoin at a point prior to the objective area. This allows time-compressed operations at the objective area while maintaining tactical surprise and limiting detection. Specific formation procedures are contained in **Chapter 18** and AFTTP 3-1, Volume 25. When flying multiple station keeping equipment (SKE) formations within 80 NMs, mission planners should use the information in **Table 16.1.** to aid in deconfliction. Additional coordination procedures are contained in AFTTP 3-1, Vol 25.

Table 16.1. SKE Frequency Deconfliction.

SKE Frequency Combinations For Multiple Formations	Minimum Formation Separation Required
Formations on the same frequency (A-A, B-B, C-C, or D-D)	80 NMs
Formations on frequencies separated by 40 MHz (A-C or B-D)	2 NMs
Formations on frequencies separated by 80 MHz (A-D)	2500 ft
Formations on frequencies separated by 120 MHz (A-B or C-D)	300 ft
Formations on frequencies separated by 160 MHz (B-C)	0 ft

NOTE: This table is based on theoretical limits, not experimental data.

16.2.6.10. Time Control. Select control times without using either extremes of the airspeed envelope to allow maximum flexibility for gaining or losing time. This does not preclude planning high speeds as a tactic to reduce threat exposure time or low speeds to enhance terrain masking or reduce turn radius. Building one or more timing triangles or orbit areas into the route prior to the objective area is one method of time control; however, factors such as formation size, airspace management, weather, terrain, and threat location must be thoroughly evaluated. Another technique is building a route with optional "timing legs" designed to gain or lose time by cutting corners or extending legs without requiring aircraft to loiter in a defined area and increasing the probability of detection. Regardless of the technique used, the mission must have a briefed time control plan.

16.2.6.11. Airspace Management. Successful employment of airlift in a combat zone demands close coordination and integration with theater airspace managers (including allies). Airspace control requirements will vary depending upon the area or zone of the theater, but are generally more intense and critical the farther forward aircraft are employed in the combat zone. The AMD is responsible for providing this information. Essential airspace management considerations are discussed in AFTTP 3-1, Vol 25 and Vol 26.

16.2.6.12. Evasion Plan of Action (EPA). Aircrews and/or planners with the assistance of intelligence personnel and life support/survival specialists, will develop an EPA. An evasion plan may be included in the OPORD or SPINS. AFTTP 3-1, Vol 25 includes suggested EPA planning information.

16.3. Crew Mission Study and Detailed Flight Planning. After mission tasking is analyzed and intelligence, weather, and mission support information is available, detailed mission planning begins. During this phase, the planning staff will study all mission variables to develop a plan, which minimizes the threat and optimizes the probability of a successful mission. Route selection should begin at the objective area. Planning should then be done in reverse from the objective to the Initial Point (IP), then to the low level or combat entry point and then to the departure base. Egress routing is then planned from the objective area to the combat exit point and recovery base. Planning routes with the most detailed scale charts available provide enhanced chart details. JOG (1:250,000) charts, if available, are recommended for planning the route to and from the objective area. Flight planning emphasis should be placed on the topographical features at least 10 NM either side of the intended flight path.

16.3.1. Objective Area Planning. The most important segment of the route is from the IP to the objective. On this segment threat avoidance, navigation, and timing are most critical. The IP should be an easily definable visual point, unique in appearance and not subject to significant alteration.

16.3.1.1. Plot the objective (target) using the most detailed scale chart available. The area should also be examined using any available imagery.

CAUTION: 1:50,000 and smaller scale maps do not depict aeronautical information, may not show man-made obstructions, and are rarely updated through the CHUM.

16.3.1.2. Evaluate hostile defenses/OBs within the area of operation. Initially plot maximum effective radar/threat ranges for worst case drop altitudes without regard to terrain masking.

16.3.1.3. Select the IP and pre-initial point (pre-IP) based on the safest approach to the objective area. Plan for large formations to cross the IP inbound on extended DZ centerline course. If the run-in can not be accomplished around maximum radar and threat ranges, evaluate terrain around the objective area and determine a flight path and altitude with the least possibility of detection.

16.3.2. Assault Zone Selection. Assault zone (assault landing zone and drop zone) selection and criteria are the joint responsibility of the DIRMOBFOR and the commander of the supported forces; however, planners may be tasked to select usable sites. Detailed assault zone criteria and illustrations can be found in AFI 13-217.

16.3.3. Drop Zone (DZ) Selection. Ground force location, risk to aircraft, and target identification are key factors in DZ selection. Drop zones may or may not be marked, depending on the type of mission, tactical situation, or reception committee capabilities (reference AFI 13-217 and AFI 11-231).

16.3.3.1. Planners will attempt to ensure that the DZ is long enough to avoid multiple passes in a hostile environment. If multiple passes become necessary, they may be accomplished by planning a racetrack/re-attack or an abbreviated route. In any case, multiple passes will not be performed unless they have been coordinated with the user, they have been planned and briefed, and they have been annotated on navigational charts (including the racetrack/re-attack flight path).

NOTE: Units should develop and publish multiple pass procedures for established drop zones used during routine joint and unilateral training. Choice of abbreviated route or racetrack procedures is at the unit's discretion.

16.3.3.2. Multiple points of impact (MPI) provide an aerial delivery employment procedure to disperse airdropped loads to predetermined locations. Locate the subsequent MPI a minimum of 500 yards from the previous PI. If MPIs are placed laterally, increase the width of the DZ accordingly. Ensure the PI distance from leading edge complies with AFI 13-217. Compute minimum size DZ required for the most restrictive aircraft in each element relative to their PI to ensure it fits within the surveyed DZ boundaries. Limit the number of MPIs to three without MAJCOM approval. All aircraft within an element must drop on the same PI. The coordinates for each PI must be provided to the aircrews. Use the most accurate PI altitude available. For SKE airdrops using a zone marker, ensure aircrews are briefed on zone marker location relative to each PI. Ensure zone marker placement is within 1,500 yards of all points of impact. Thoroughly deconflict and brief all salvo and escape procedures as well as DZ markings prior to mission execution. Only the first PI will be marked. The user accepts responsibility when employing MPI for all injury/damage to personnel/equipment.

16.3.3.3. The following types of drop zones are authorized for airlift employment missions:

16.3.3.3.1. Marked DZ. Authenticated drop zone, which has the point-of-impact or release point, marked with a pre-coordinated signal. Markings may be overt (e.g., block letter, flares, smoke, mirror, raised angle marker, etc.) or covert (e.g. IR strobe, radar beacon, zone marker, etc.). No other markings are required (e.g., timing lights or flanking lights). Unless radio communications are specifically required, any precoordinated marking displayed on the DZ indicates clearance to drop.

16.3.3.3.2. Unmarked DZ (requires MAJCOM DO approval). Drop zone not authenticated with any type of marking. This includes both visual and electronic signals. DZ authentication, if required, is possible via radio communications. The DZ may not be supported by a reception team. Use of unmarked DZs requires OG/CC approval for unilateral missions, and MAJCOM/DO approval for all other missions.

16.3.3.3.3. Area DZ. Consists of a start point, end point, and a prearranged flight path over a series of acceptable drop sites between these points. The distance between these points should not exceed 15 nautical miles; changes in ground elevation along the flight path should not exceed 300 feet; and drop sites along the flight path should not exceed 1/2 NM on either side.

16.3.3.3.4. Circular/Random Approach DZ. A circular DZ with multiple run-in headings. Size of the DZ will be governed by mission requirements and usable terrain. Normally, the point-of-impact will be at the DZ center. The size of a circular/random approach DZ must be large enough for the prescribed minimum size rectangular DZ to fit inside.

16.3.3.3.5. Water DZ. Normally a circular/random approach drop zone which may be marked or unmarked. CARP, GMRS, VIRS, or jumpmaster directed airdrop procedures may be used. For GMRS, the position of the recovery/safety boat usually marks the intended release point. Other options include three or more boats in formation to form an inverted "L" or a floating smoke pot to indicate the point-of-impact.

NOTE: Certain combat/contingency situations may prevent marking the DZ. Aircrews may be required to airdrop on unmarked DZs; however, supported units must be made aware that drop accuracy may be reduced. Planners and aircrews must thoroughly develop run-ins with good visual points for timing. Specific airdrop procedures and reception committee capabilities are in **Chapter 19** and AFI 13-217.

16.3.4. Assault Landing Zones (ALZ). Assault landing zone operations are conducted to introduce or evacuate personnel and/or equipment to or from hostile, denied, or unsecured territory. As a general rule, DZ selection considerations also apply to ALZ selection. Aircraft performance limitations must be taken into account when selecting a ALZ location. ALZ size and composition criteria is contained in AFI 13-217.

16.3.4.1. Plan approaches to the ALZ according to **Chapter 17** and airfield identification procedures published in the OPORD or SPINS. Where multiple options are available, select the approach which best minimizes exposure to the threat while still allowing a high probability of landing on the first approach. Remain unpredictable. If no published approach exists, training approaches may be developed, but VFR weather is required.

16.3.5. Route Planning. Route selection is dictated by threats, terrain, and aircraft limitations. Evaluate all possible ingress and egress routes for features such as terrain composition and cover, relief features, contour lines, population centers, lines of communication, and other hazardous or compromising areas. Low-altitude masking tactics are essential for penetration operations in a threat environment. The following factors significantly influence route development:

16.3.5.1. In selecting navigation routing, the planner must consider safe passage corridors/procedures and the location of friendly defenses. In this regard, the aircraft must be constantly aware of the status of friendly C3 and procedures for degraded operation. When the friendly C3 structure degrades, the common denominator of friendly defenses will be their own self-preservation. When planning the route, do not assume your aircraft is safe from friendly lines of defense. Plan accordingly and use IFF, communication discipline, and approved safe passage procedures.

16.3.5.2. Threat avoidance is the best line of defense. Plan routes to avoid SAMs and AAA concentrations, both of which are usually along lines of communication, intersections, populated areas, and industrial centers. Canals, roads, railroads, and rivers should be crossed at right angles to minimize detection by hostile forces. Select high, rugged vegetated terrain where possible. Rough terrain decreases threat mobility, heavy vegetation restricts the field of fire, and low altitudes enhance terrain masking. Evaluate passive and acoustical detection devices; border guards, observation posts, and fire towers; road and river traffic; railroads; military maneuvers and exercises; military aircraft training; airways and airports; surveillance and patrol boats; fishing vessels; shipping LOCs; festival, holiday, and vacation gathering places; satellite schedules.

16.3.5.3. Plan the route using maximum radar/threat detection ranges and worst case route/leg minimum safe altitude (MSA) without regard to terrain masking. If routing cannot be accomplished around maximum radar/threat ranges, evaluate significant terrain between the aircraft and the threat and maximum detection free altitudes must be evaluated to determine a flight path and altitude with the least possibility of detection.

16.3.5.4. Flights should be planned at the highest altitude that precludes detection. If detection is probable, select flight altitudes which degrade threat engagement effectiveness.

16.3.5.5. Dead reckoning (DR) navigation is enhanced by prominent landmarks with good vertical development. Natural terrain features are preferable to man-made features, which may no longer exist, may be indistinct, or may be newly erected and not portrayed. Use of features that could be masked by intervening terrain should not be used.

16.3.5.6. Do not plan direct flight over built-up areas.

16.3.5.7. When unable to avoid hostile areas, select specific tactics, such as terrain masking, night operations, random approaches, or use of support aircraft, which can best counter anticipated threats.

16.3.5.8. Avoid large bodies of water and dry lakebeds except in known friendly areas. Camouflage is less effective, sound travels farther and radar detection is more likely.

16.3.5.9. Coastal Penetration. The tactics used to penetrate a coastline depend on the locations and elevations of coastal radar sites. Passive detection is usually enhanced over water. Minimize use of aircraft radar and other emitters.

16.3.5.10. Remain unpredictable. The route of flight will consist of relatively short legs between waypoints, which are easily identifiable, either visually or by airborne radar. Select waypoints, which minimize detection and maximize threat avoidance and terrain masking. Numerous course changes protect the aircraft and also the objective area by delaying enemy attempts to predict the flight path. The time and distance of each leg should vary and not exceed 10-minutes in the threat environment.

16.3.5.11. Avoid being skylighted. Go around hills rather than over them. If a ridge must be crossed, do so at a low point and, ideally, at a 45-degree angle.

16.3.5.12. Plan to fly in shadows whenever possible and place the aircraft's shadow in terrain shadows. Missions operating in or near a threat environment should be planned to transit that environment during early morning or late afternoon. The low sun angles will separate your shadow from the aircraft, improving your masking. Hide your shadow in a ridgeline, ridge shadow, cloud shadows or dark vegetation if possible. Missions flown at night or in the clouds can significantly degrade certain threat systems. Knowledge of enemy threat system shift changes and scheduled preventive maintenance times may prove invaluable when considering these options.

16.3.5.13. Turns should not be made into significantly higher terrain or other hazards without thorough analysis of aircraft engine-out climb performance.

16.3.5.14. Transit areas defended by small arms at their narrowest or least defended point.

16.3.5.15. If detection is unavoidable, compute the first possible point at which fighters could attack the aircraft. Intelligence personnel should have information on command and control time (from acquisition to launch), aircraft speed and capabilities, and ground control intercept (GCI) limitations.

16.3.5.16. If flight over or near threat sites is unavoidable, attack aircraft should be part of the employment support package.

16.3.5.17. Vertical and horizontal depiction inaccuracies will exist in virtually all chart products. Many charts list the probable errors in their legend.

16.3.5.18. Define abort corridors for the ingress route. Depending on threats and other aircraft following the same ingress route, the planned route over the objective and egress may be the safest abort route.

16.3.6. Target Detection and Radar Coverage Prediction Guide**.** Flights should be planned through areas that preclude radar detection. Radars have three vulnerabilities that can be exploited during mission planning; limits on maximum detection range, degraded low-level detection capabilities because of curvature of the earth (radar horizon distance), and the masking properties of obstructions between the antenna and the aircraft.

16.3.6.1. Maximum Range. The theoretical maximum range (MTR) of a radar is dependent on the radar's pulse repetition frequency (PRF). The higher the PRF, the shorter the range. Use the radar's lowest PRF in the following formula to compute the MTR in nautical miles : MTR = 80,000/PRF.

16.3.6.2. Radar Horizon Distance (RHD). A radar may have the theoretical range to detect an aircraft, but will be limited by the horizon (curvature of the earth) for a given aircraft altitude. Based on the line of sight limitation, flying at a distance greater than the RHD will prevent aircraft detection under normal atmospheric conditions. The following formula is primarily use to determine low altitude coverage of a radar over water or flat terrain; however, planning a route which exceeds RHD in any type of terrain should prevent detection. **Table 16.2.** will aid in quickly determining RHD. Enter the table with the aircraft's planned MSL altitude at the top of the table and move down to the radar antenna's MSL altitude to determine RHD in NMs: RHD = 1.06 [square root of RA $(\sqrt{RA})$ + square root of AA $(\sqrt{AA})$]. Where RA = radar antenna elevation (feet AGL); AA = aircraft altitude (feet AGL); RHD will be expressed in NMs. To express RHD in statute miles, use 1.23 instead of 1.06.

NOTE: This computation assumes a smooth earth. Masking effects from obstructions between the radar and the aircraft are not considered. Atmospheric ducting can greatly increase the RHD at some altitudes. Always check with weather personnel for the presence or potential of ducting in the area of operations. Passive detection of aircraft emissions may occur far beyond the RHD regardless of ducting.

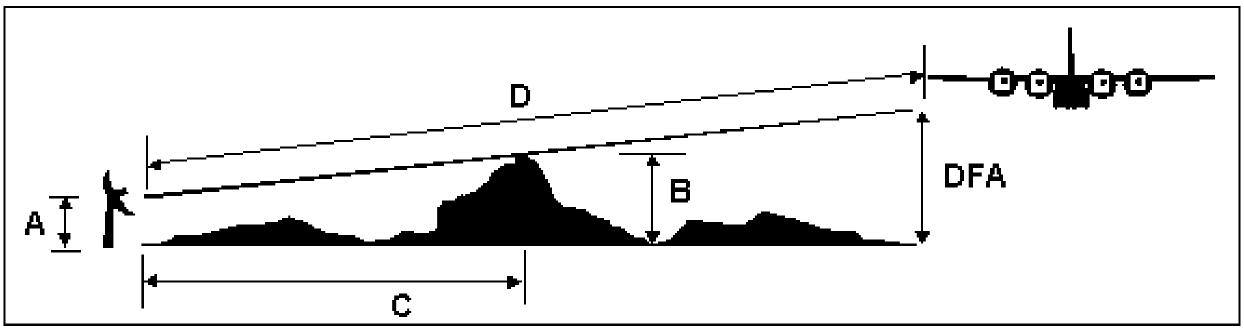
Table 16.2. Radar Horizon Distance (RHD)--Nautical Miles (NM).

		AIRCRAFT ALTITUDE (ft)																	
		200	**300**	**500**	**750**	**1000**	**2000**	**3000**	**4000**	**5000**	**6000**	**7000**	**8000**	**9000**	**10000**	**15000**	**20000**	**25000**	**30000**
R	**50**	22	26	31	37	41	55	66	75	82	90	96	102	106	113	137	157	175	191
A	**100**	26	29	34	40	44	58	69	78	86	93	99	105	111	117	140	161	178	194
D	**150**	28	31	37	42	47	60	71	80	88	95	102	108	114	119	143	163	181	197
A	**200**	30	33	39	44	49	62	73	82	90	97	104	110	116	121	145	165	183	199
R	**250**	32	35	41	46	50	64	75	84	92	99	105	112	117	123	147	167	184	200
	300	33	37	42	47	52	66	76	85	93	100	107	113	119	124	148	168	186	202
A	**350**	35	38	44	49	53	67	78	87	95	102	109	115	120	126	150	170	187	203
N	**400**	36	40	45	50	55	69	79	88	96	103	110	116	122	127	151	171	189	205
T	**450**	37	41	46	52	56	70	81	90	97	105	111	117	123	128	152	172	190	206
E	**500**	39	42	47	53	57	71	82	91	99	106	112	119	124	130	154	174	191	207
N	**550**	40	43	49	54	58	72	83	92	100	107	114	120	125	131	155	175	192	208
N	**600**	41	44	50	55	59	73	84	93	101	108	115	121	127	132	156	176	194	210
A	**650**	42	45	51	56	61	74	85	94	102	109	116	122	128	133	157	177	195	211
	700	43	46	52	57	62	75	86	95	103	110	117	123	129	134	158	178	196	212
H	**750**	44	47	53	58	63	76	87	96	104	111	118	124	130	135	159	179	197	213
E	**800**	45	48	54	59	64	77	88	97	105	112	119	125	131	136	160	180	198	214
I	**850**	46	49	55	60	64	78	89	98	106	113	120	126	131	137	161	181	199	215
G	**900**	47	50	56	61	65	79	90	99	107	114	121	127	132	138	162	182	199	215
H	**950**	48	51	56	62	66	80	91	100	108	115	121	127	133	139	163	183	200	216
T	**1000**	49	52	57	63	67	81	92	101	109	116	122	128	134	140	163	183	201	217
	2000	62	66	71	76	81	95	105	114	122	130	136	142	148	153	177	197	215	231

16.3.6.3. Detection Free Altitude (DFA). Radar detection is degraded or denied by terrain and obstacle between the radar antenna and the target aircraft. The following formula is used to determine the highest altitude an aircraft can transit a point and remain below a radar's coverage. It is based on the line of sight limitation when obstacles or terrain lie between the radar and the aircraft. See **Figure 16.1.**. Formula: DFA = [(B - A) / C + (D - C) / 15] x D + A. where DFA = Detection Free Altitude (feet MSL); A = Antenna elevation (feet MSL); B = Terrain elevation (feet MSL); C = Terrain distance from antenna (NM); and D = Aircraft distance from antenna (NM).

NOTE: Flying below the DFA will deny detection by that radar only at the point for which the calculation is made. Passive detection of aircraft emissions may occur even when the aircraft is terrain masked.

Figure 16.1. Detection Free Altitude (DFA).



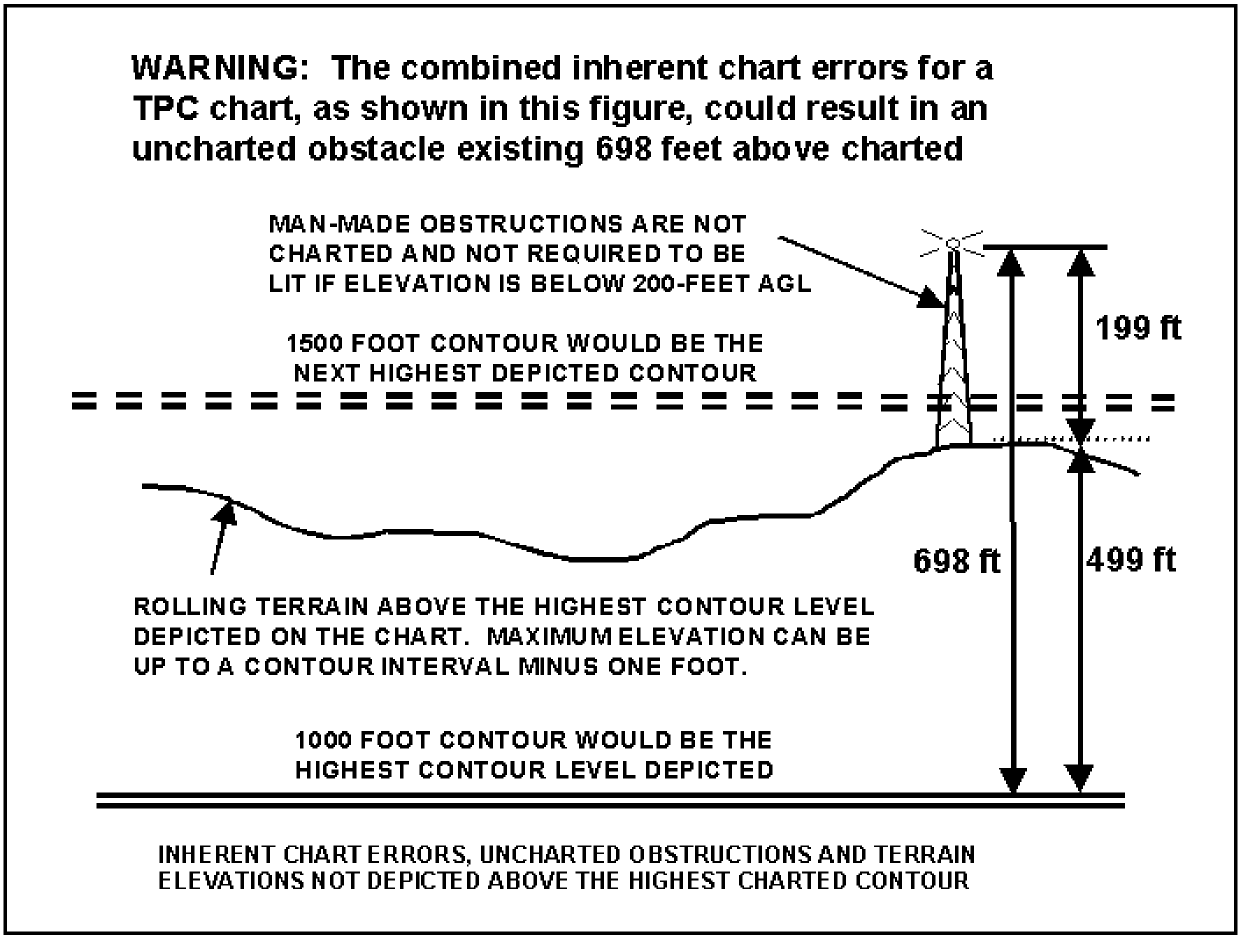
16.3.6.4. Range Planning. For planning purposes, mission aircraft should be routed outside the maximum theoretical radar range. If this is not possible, plan the route outside the RHD or below the DFA.

16.3.7. Low-Level Altitude Restrictions. Low-level altitudes will depend on conditions such as terrain, threat, the necessity to avoid detection, and equipment limitations. The following minimum altitudes are established for C-130 airlift operations. Higher altitudes may be dictated by FLIP/ICAO procedures, training considerations, terrain, or operational directives.

WARNING: Aeronautical charts do not depict man-made obstacles less than 200 feet AGL or a change in terrain until it exceeds the chart contour interval. The worst situation would occur if a 199-foot tower sat on terrain with an elevation just below the next higher contour. For a TPC (1:500,000) with a contour interval of 500 feet, this results in an uncharted obstacle existing 698 feet above charted terrain. Additionally, the highest spot elevation on any given leg may not be the highest terrain as in the case of gradually rising elevations. Planners must ensure accurate terrain analysis be evaluating both spot elevations and the highest contour level. **Figure 16.2.**, Inherent Chart Error, illustrates uncharted obstacles and terrain elevations not depicted above the highest chart contour.

CAUTION: Some charts may depict terrain and obstacle altitudes in meters versus feet (e.g., JOG and TLM charts in some areas of the world).

Figure 16.2. Inherent Chart Error.



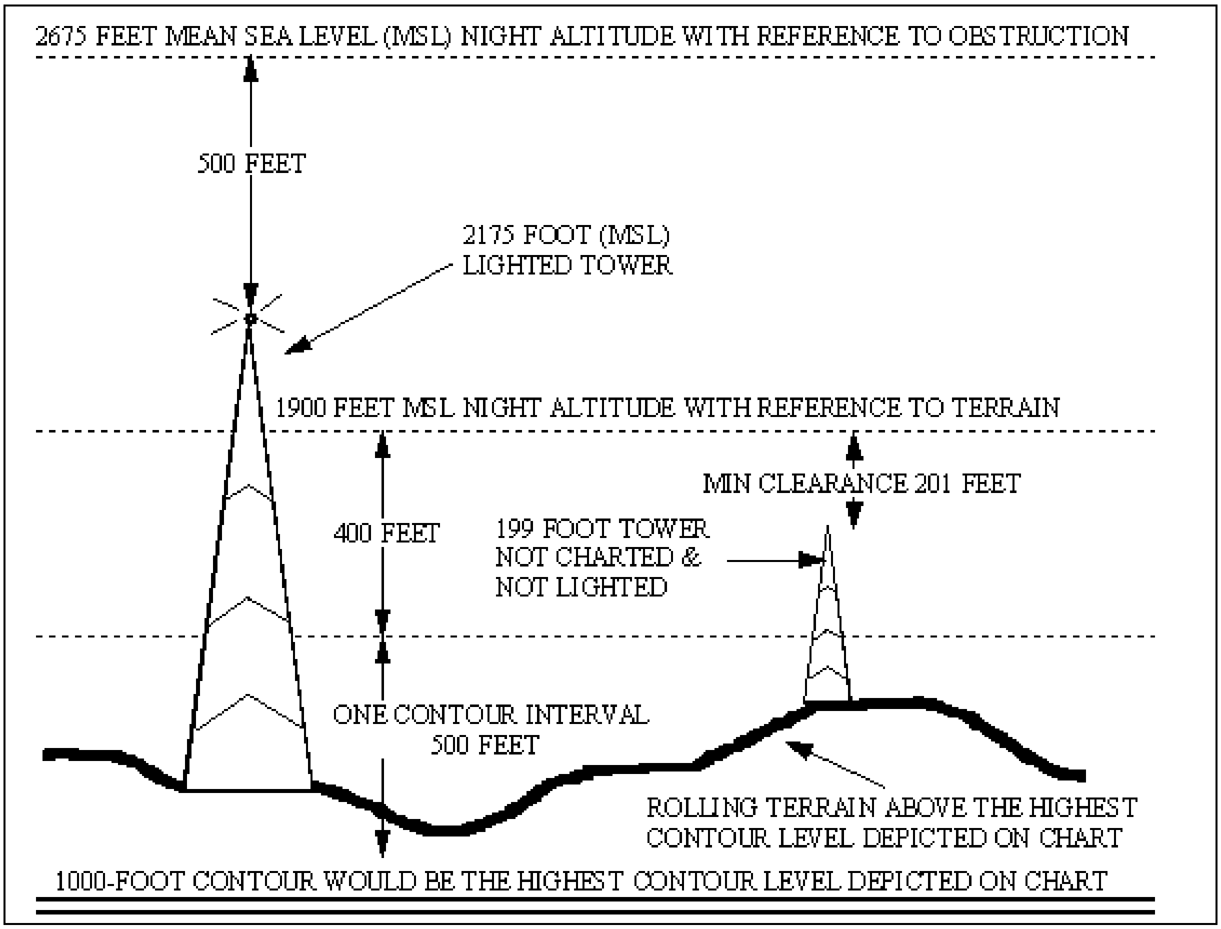
16.3.7.1. Day VMC Enroute. Plan a minimum of 500 feet AGL (300 AGL on approved routes) modified contour altitude above the terrain using visual references and radar altimeter.

16.3.7.2. Night VMC Enroute. Plan enroute legs at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one chart contour interval above the highest depicted terrain contour, whichever is highest, within 5 NMs of route centerline (10 NMs outside CONUS) to include the aircraft turn radius over each turnpoint. If the altitude for the next leg is higher than the current leg altitude, climb will be completed prior to the turnpoint. If the altitude for the next leg is lower than the current leg, do not initiate descent until over the turnpoint. Legs may be divided into segments for night altitude computations, depending on terrain differential or threats in order to allow flight closer to the ground. Once the obstacle or terrain feature is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower (see **Figure 16.3.**).

NOTE: Planning a route on a JOG chart, if available, significantly reduces night enroute altitudes. If the route has been planned on a JOG and night altitudes are verified, the route may be flown with the lower altitudes when flying with reference to a tactical pilotage chart (TPC).

16.3.7.3. Minimum Safe Altitude (MSA). MSA is an initial VFR altitude that provides additional terrain clearance while the aircrew analyzes situations that require interruption of low-level operations (route disorientation and equipment malfunctions or when either pilot must leave the seat during low-level operations, etc.). An MSA will be computed for each leg, route segment, or entire low-level route. Compute MSA the same as night altitudes in paragraph **16.3.7.2.**.

Figure 16.3. Minimum Night VMC Enroute Altitude.



16.3.7.4. Minimum IFR Enroute Altitude. Compute minimum IFR enroute altitude by adding 1,000 feet (2,000 feet in mountainous terrain) above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation) within 5 NMs of route centerline (10 NMs outside the US). Round this altitude to the next 100-foot increment.

16.3.7.4.1. Minimum altitudes for IFR operations within published Military Training Routes (MTRs) in US sovereign airspace will be the computed leg MSAs unless a higher altitude is required by FLIP AP/1B.

16.3.7.5. Emergency Safe Altitude (ESA). ESA is designed to provide positive IMC terrain clearance during emergency situations that require leaving the low-level structure. Several ESAs may be computed for route segments transiting significant terrain differentials, or a single ESA may be computed for the entire low-level route. To compute ESA, add 1,000 feet (2,000 feet in mountainous terrain) to the elevation of the highest obstruction to flight within 22 NMs either side of the planned route centerline.

NOTE: Climbing to the ESA may put the aircraft in a controlled (i.e., IFR) altitude structure requiring coordination with air traffic control agencies.

NOTE: Pressure altimeters are calibrated to indicate true altitudes under international standard atmospheric (ISA) conditions. Any deviation from these standard conditions will result in erroneous readings on the altimeter. This error becomes important when considering obstacle clearances in temperatures lower than standard since the aircraft's altitude is below the figure indicated by the altimeter. Refer to the flight information handbook to determine correction.

16.3.8. Airdrop Altitudes and Airspeeds. Minimum airdrop altitudes and airspeeds for specific loads and parachutes are defined in AFI 11-231. If minimum terrain clearance cannot be satisfied during descent to drop altitude, change the run-in course, delay descent, step down to drop altitude, or airdrop at a higher altitude. The pressure altimeter should be cross-checked with the radar altimeter during the run-in to the DZ to help ensure the aircraft is at or above the minimum drop altitude. Airdrops will not be conducted below the following altitudes:

WARNING: DZ surveys do no assure terrain and obstruction clearance. Planners and aircrews are responsible for ensuring clearance through mission planning/chart preparation.

NOTE: During visual airdrops, altitudes on DZ run-in may be segmented to allow for lowest possible run-in/drop altitude. Once the limiting obstruction (man-made obstruction or terrain feature) is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segment altitude, if lower.

16.3.8.1. Day VMC Drop Altitude. Plan minimum day VMC airdrop altitudes as specified in AFI 11-231, visually avoiding high terrain and obstacles in the vicinity of the drop zone.

16.3.8.2. Night VMC Drop Altitude. Plan minimum night VMC airdrop altitudes, from slowdown through escape, at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is higher, within 3 NM of run-in centerline, or as specified in AFI 11-231, whichever is higher.

Table 16.3. Visual Slowdown Chart (Minimum Distance (in NMs) From Slowdown Point to CARP.

	Tailwind Component			No Wind	Headwind Component	
	30 Kts	20 Kts	10 Kts	0 Kts	10 Kts	20 Kts
Level or Ascent/Descent < 500	8.1	7.9	7.7	7.4	7.2	6.9
Ascending > 500	7.3	7.1	6.9	6.7	6.5	6.3
Descending						
1000’	8.5	8.2	7.9	7.6	7.3	7.0
2000’	11.6	11.1	10.6	10.1	9.6	9.2
3000’	14.5	13.9	13.2	12.6	12.0	11.3
4000’	17.6	16.8	16.0	15.2	14.4	13.6
5000’	20.9	19.9	18.9	17.9	16.9	15.9
6000’	24.0	22.9	21.7	20.6	19.5	18.3
7000’	27.2	25.9	24.6	23.3	22.0	20.7
8000’	30.6	29.0	27.5	26.0	24.6	23.1
9000’	33.9	32.2	30.6	28.9	27.2	25.6

DATA BASIS:

1. Descent slowdown at 140 KIAS/1000 FPM >.

2. Ascent slowdown with 5 degree nose up attitude and 140 KIAS >.

3. Aircraft level and in drop configuration prior to the one-minute warning (1.7 to 2.8 NMs prior to DZ).

4. Deceleration factor (level or descent slowdown) .25 NM air distance consumed per 10 knots of airspeed lost, based on standard day temperature at sea level.

5. Deceleration factor (ascending slowdown) .182 NM air distance consumed per 10 knots of airspeed lost, based on standard day temperature at sea level.

6. Level or ascending slowdown distance includes the following:

6.1. Time for deceleration to door opening speed (based on applicable deceleration factor).

6.2. 30-second door opening time.

6.3. 30 seconds for checklist completion.

7. These distances are based upon 250 KIAS at slowdown initiation. They should be adjusted by the appropriate deceleration factor for each 10 knots above or below this speed.

NOTE: The slowdown distance indicated is suitable for a permissive environment and should be used as a guide for planning. However, in areas of significant threat, slowdown distances should be modified.

CAUTION: During night visual descending slowdowns, distances extracted from this chart must be compared to obstructions depicted on topographical charts to insure adequate terrain clearance.

16.3.8.3. IMC Drop Altitude. Plan minimum IMC drop altitudes at 500 feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is highest, within 3 nautical miles either side of the run-in centerline from DZ entry point to DZ exit point or as specified in AFI 11-231, whichever is higher.

16.3.8.4. IMC Drop Profile. See **Figure 16.4.**.

16.3.8.4.1. IFR Drop Corridor. As defined in FAR Exemption 4371, the corridor where aircraft may operate below IFR enroute altitude. The beginning of the corridor, the IFR Drop Corridor Ingress Point, is a maximum of 40 NMs from the IFR Drop Corridor Egress Point (co-located with the DZ Exit Point). Plan segmented corridor altitudes not lower than 500 feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), or 400 feet plus one contour interval above the highest depicted terrain contour, whichever is highest, within 3 NMs either side of centerline.

16.3.8.4.2. DZ Entry Point. A fixed point in the IFR Drop Corridor where an aircraft or formation may safely begin descent from IFR enroute altitude or a segmented altitude to IMC drop altitude. Formation descent will not begin until the last aircraft is at or past the DZ entry point. To extract this distance from **16.4.**, compute the slowdown point for the last aircraft and subtract the deceleration distance.

16.3.8.4.3. Earliest Descent Point (EDP). Earliest point in the IFR Drop Corridor where formation lead may descend the entire formation to IMC drop altitude and be assured of terrain clearance. Computed by subtracting formation length (e.g., a 4-ship is 2 NMs long) from the computed DZ entry point. The EDP provides, as a minimum, a 6 NM IMC stabilization point.

16.3.8.4.4. IMC Stabilization Point. The point after the DZ entry point where the lead aircraft will plan to be stabilized at IMC drop altitude and airspeed.

16.3.8.4.5. Latest Descent Point (LDP). Latest possible point in the IFR corridor where formation lead may begin descent to IMC drop altitude and be assured of terrain clearance for the entire formation. This is the latest point that ensures all aircraft in the formation are stabilized on drop altitude and airspeed according to **Chapter 18** and **Chapter 19**.

NOTE: Descending at the LDP does not provide a 6NM IMC stabilization point.

16.3.8.4.6. DZ Exit Point. A fixed point on the DZ escape flight path centerline where each aircraft will be at minimum IFR enroute altitude. Calculate the exit point based on three-engine performance at airdrop gross weight. This point will be a minimum of 4 NMs track distance from the trailing edge of the DZ. Also referred to as the IFR Drop Corridor Egress Point.

Table 16.4. SKE Slowdown Chart (Minimum Distance (in NMs) Required From Slowdown To Stabilization Point).

	Tailwind Component			No Wind	Headwind Component	
	30 Kts	20 Kts	10 Kts	0 Kts	10 Kts	20 Kts
Level or Ascent/ Descent < 500’	5.3	5.3	5.3	5.2	5.2	5.1
Ascending > 500’	4.5	4.5	4.5	4.5	4.5	4.5
Descending						
1000’	5.7	5.6	5.5	5.4	5.3	5.2
2000’	8.8	8.5	8.2	7.9	7.6	7.4
3000’	11.7	11.3	10.8	10.4	10.0	9.5
4000’	14.8	14.2	13.6	13.0	12.4	11.8
5000’	18.1	17.3	16.5	15.7	14.9	14.1
6000’	21.2	20.3	19.3	18.4	17.5	16.5
7000’	24.4	23.3	22.2	21.1	20.0	18.9
8000’	27.8	26.4	25.1	23.8	22.6	21.3
9000’	31.1	29.6	28.2	26.7	25.2	23.8

DATA BASIS:

1. Descent slowdown at 140 KIAS/1000 FPM >.

2. Ascent slowdown with 5 degree nose up attitude and 140 KIAS >.

3. Aircraft level and in drop configuration prior to the one-minute warning (1.7 to 2.8 NMs prior to DZ).

4. Deceleration factor (level or descent slowdown) .25NM air distance consumed per 10 knots of airspeed lost, based on standard day temperature at sea level.

5. Deceleration factor (ascending slowdown) .182NM air distance consumed per 10 knots of airspeed lost, based on standard day temperature at sea level.

6. Level or ascending slowdown distance includes the following:

6.1. Time for deceleration to door opening speed (based on the applicable deceleration factor).

6.2. 30-second door opening time.

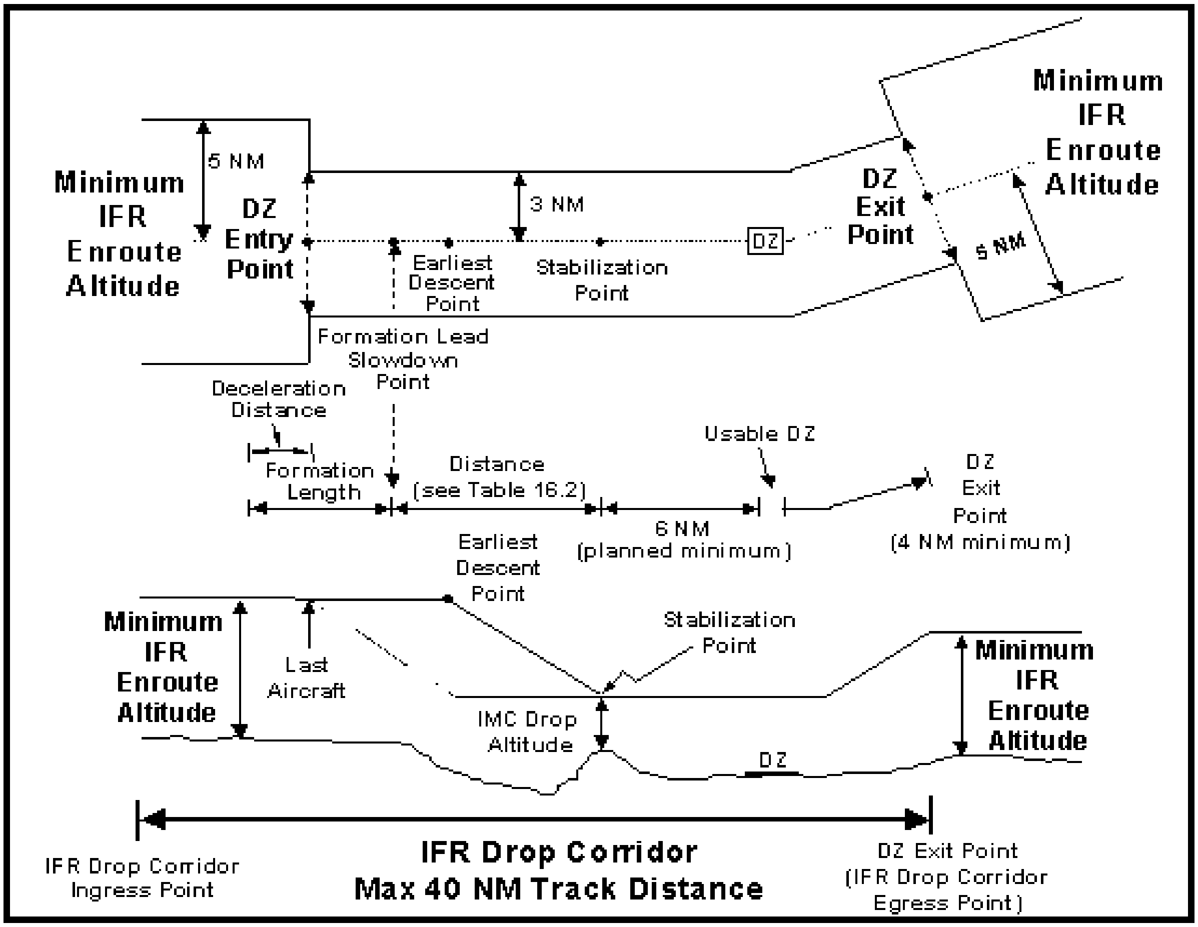
6.3. 30 seconds for checklist completion.

7. These distances are based upon 210 KIAS at slowdown initiation. They should be adjusted by the appropriate deceleration factor for each 10 knots above or below this speed.

NOTE: The slowdown distance indicated is suitable for a permissive environment and should be used as a guide for planning. However, in areas of significant threat, slowdown distances should be modified.

CAUTION: During all SKE slowdowns, distances extracted from this chart must be compared to obstructions depicted on topographical charts to insure adequate terrain clearance.

Figure 16.4. IMC Drop Profile.



16.3.9. Peacetime Route Restrictions. In addition to restrictions in AFI 11-202V3, specific country or theater of operations publications, and FLIP area planning, routes will not be planned or flown:

16.3.9.1. With less than 1 NM separation (3 NMs in excess of 250 KIAS) when below 2,000 feet AGL from known sensitive environmental areas such as hospitals, fish hatcheries, ostrich and emu farms, large poultry complexes, recreation areas, institutions, and similar locations.

16.3.9.2. With less than 3 NMs separation from prohibited airspace.

16.3.9.3. Less than 3 NMs separation from nuclear power plants.

16.3.9.4. Through restricted airspace, except transition or termination in such areas where the planning unit is a primary using agency or has approval of the controlling agency.

16.3.9.5. In weather conditions less than specified in this AFI and AFI 11-202V3.

16.3.9.6. Below 1000' AGL within a 2000' radius over cities or towns shown as magenta shaded areas on 1:500,000 (TPC) scale charts.

16.3.9.7. Over or through active live fire or impact areas that may not be specifically designated as prohibited or restricted areas.

16.3.9.8. Below 500 feet AGL unless:

16.3.9.8.1. Host nation rules specifically allow such VFR operations.

16.3.9.8.2. Routes or training areas have been environmentally assessed and surveyed for 300-foot AGL operations. ***NOTE***: This restriction does not apply to one-time-use routes. Consult FLIP AP/1B for published Military Training Route restrictions.

16.3.9.9. For the airdrop portion of all SKE missions in uncontrolled airspace, the mission command unit must comply with appropriate FAA exemptions. Provide a notice to airmen (NOTAM) to the FAA flight service station nearest the objective area at least 48 hours in advance of the intended activity, regardless of actual or forecast weather. NOTAM information will include:

16.3.9.9.1. Name of the nearest city or town and state.

16.3.9.9.2. Date and time period of intended activity.

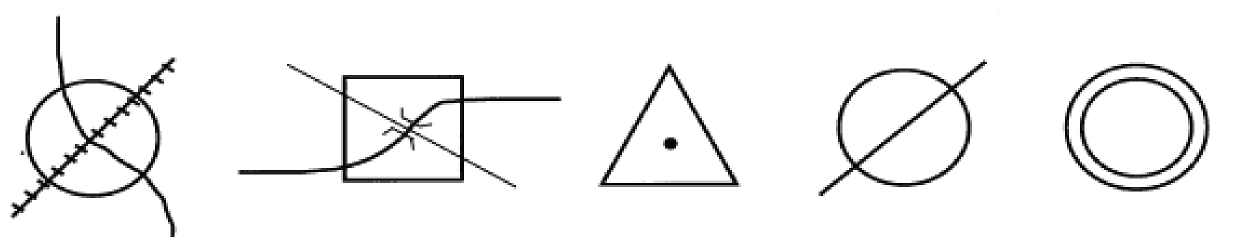
16.3.9.9.3. Number and type of aircraft.

16.3.9.9.4. Altitudes.

16.3.9.9.5. IFR Drop Corridor Ingress and Egress points of the route segment expressed in radial and DME from a VORTAC.

16.3.10. Navigation Chart Preparation. Mission planners will construct a master chart for mission briefings and aircrew reference. Planners may construct the chart using computerized mission planning systems if available. Sectional charts depict controlled airspace. Copilot and navigator crewmembers will use individual tactical navigation route charts for each mission. Low-level navigation charts will be annotated with any added, deleted, or changed information in the most recent CHUM or supplement. In no case will CHUM coverage be less than 22 NMs either side of the entire planned route of flight. Crews may trim charts to no less than 10 NMs after establishing the ESA. Color copies, if available, of a master chart reduce the probability of missing or misplotted data on aircrew charts.

16.3.10.1. Chart Annotation. In addition to applicable **Chapter 11** requirements, the following chart annotations and symbols will be on the master plan chart; however, an individual's chart annotations should have, as a minimum, turnpoints, IP, DZ, course line, course data, CHUM data, and ESA.



Turnpoint/ Waypoint | Initial Point | Objective | Emergency Airfield | Alt. Recovery Base

16.3.10.1.1. Turnpoint/Waypoint. A circle will depict both enroute turnpoints and key enroute navigation waypoints. Points may be lettered, numbered, or code-named to facilitate identification.

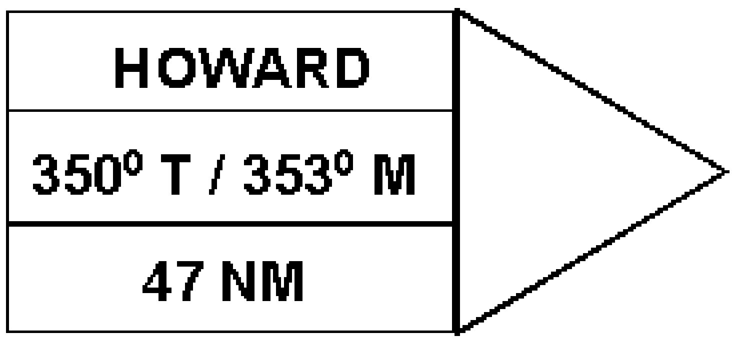
16.3.10.1.2. Initial Point (IP). Annotated as a square, this is normally a visually significant geographic point that marks the beginning of the course to the objective.

16.3.10.1.3. Objective. Annotated as a triangle, this point is significant as the target of the airlift mission (normally a DZ or ALZ).

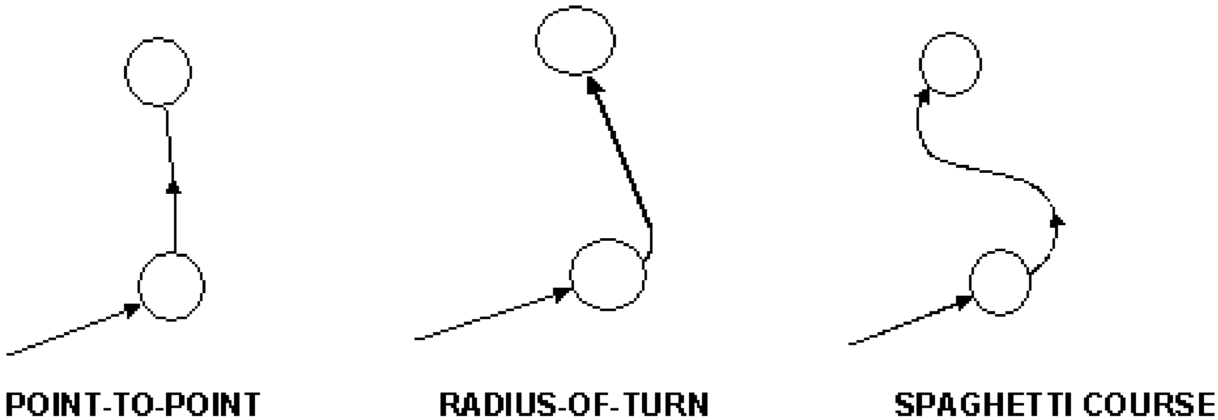
16.3.10.1.4. Emergency Airfield. An airfield which is not planned as the primary or alternate recovery base but may be used for landing. A circle with a diagonal line placed along the axis of the primary landing runway identifies emergency airfields suitable to mission aircraft. Optimum emergency airfields are located within 50 NMs of intended route approximately every 100 NMs.

16.3.10.1.5. Alternate Recovery Base. Two concentric circles identify an airfield suitable for unit aircraft recovery should the primary recovery base be unusable due to weather, damage, or other reason. Plot a course from either a planned divert point or from the primary recovery base to the alternate.

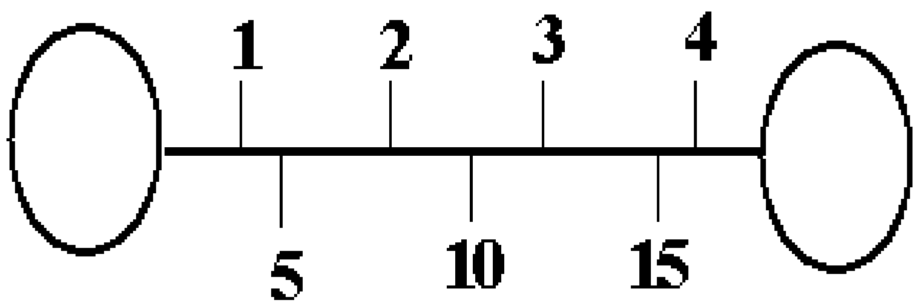
16.3.10.1.6. Recovery Arrow Box. A horizontally divided arrow box pointing in the general direction of the alternate recovery base, providing base name, true/magnetic course and distance to the alternate.



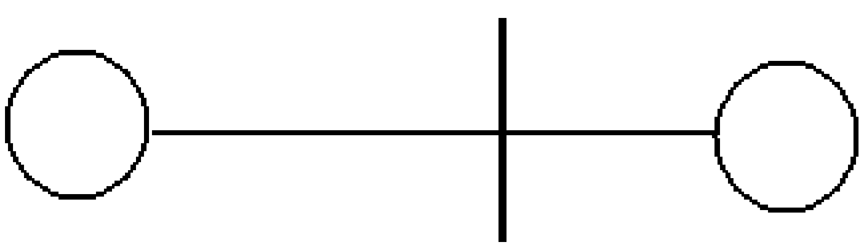
16.3.10.1.7. Course Line. The route of flight may be plotted using point-to-point, radius-of-turn, or spaghetti course. Point-to-point usually assumes turning short of the waypoint, however it may be modified to overfly the waypoint and intercept the waypoint and intercept the next point-to-point course. Radius-of-turn results in waypoint overflight, followed by a direct course to the next waypoint. Spaghetti routes reflect the aircrew's preplanned terrain masking/threat avoidance flight path. Course data is normally segmented along the route.



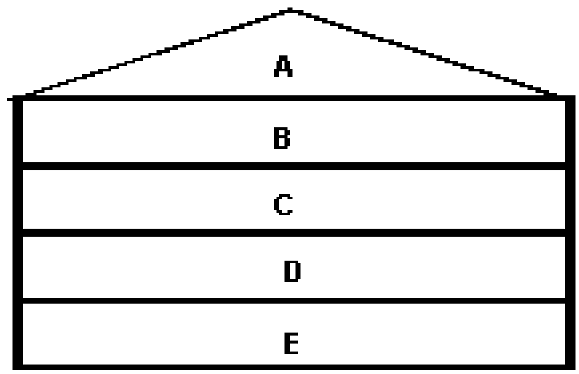
16.3.10.1.8. Time and Distance Marks. Small tick marks along each leg to show time or distance to go to the next turnpoint/waypoint.



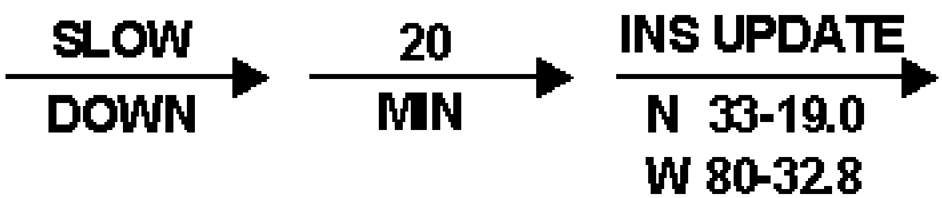
16.3.10.1.9. Combat Entry (CEP) or Exit Point. A heavy line crossing perpendicular to the course, locating the earliest or latest point at which the threat can detect or intercept the aircraft.



16.3.10.1.10. Navigation Information Block. Provides navigation information for each leg of the route. It is normally placed to the right of each turnpoint, or at the beginning of each strip chart leaf if the route leg extends beyond one leaf. As a minimum, true or magnetic course, leg distance, day or night enroute altitude, and MSA will be annotated along each leg of the route. This block may be modified for mission requirements, however, the standard block contains items A through E as follows: A = true or magnetic course (after rollout) to the next waypoint/objective, B = distance (in NM or total distance to go) to the next waypoint or objective, C = day altitude (AGL), D = night altitude (MSL), and E = MSA.



16.3.10.1.11. Operational Advisory Arrows. Annotations concerning operational aspects of the mission, located where the enroute maneuver should be performed. Examples of these maneuvers are start climb, or begin descent. Advisory arrows may also be used to denote locations of airdrop checklist execution. Avoid chart annotations that may compromise the mission.



16.3.10.1.12. Emergency Safe Altitude (ESA). ESA will be conspicuously annotated.

16.3.10.1.13. Multiple Passes. Depict racetracks or abbreviated routes associated with multiple passes over the drop zone. Multiple passes can be planned and flown three different ways:

16.3.10.1.13.1. Racetrack. A racetrack is accomplished by turning 180 degrees and paralleling DZ course outbound for a set distance before turning back inbound for a second run-in to the DZ.

16.3.10.1.13.2. Abbreviated Route. An abbreviated route is accomplished by executing the planned escape maneuver and entering a short, multiple leg circuit back to the IP for a second run-in to the DZ.

16.3.10.1.13.3. Re-attack. A re-attack is accomplished by extending along DZ centerline for a set distance, turning, and approaching the DZ from the opposite direction or perpendicular to course.

16.3.10.1.14. Order of Battle (OB). Denote location, type, and effective radii of enemy systems. Mark charts with appropriate classification if required and handle accordingly.

16.3.10.1.15. The location of the IFR Drop Corridor, DZ entry point, EDP, LDP, IMC stabilization point, and DZ exit point.

16.3.10.1.16. Strip Chart Booklets. These booklets of navigational charts provide a continuous depiction of a route and are normally prepared in one of two formats. The exact format and information required may be standardized within wings.

16.3.10.1.16.1. Format 1 consists of a booklet with a hinge at the bottom. The chart segments are stripped and glued to present a continuous route of flight.

16.3.10.1.16.2. Format 2 is constructed with a vertical hinge on the left side as in a normal book. Preferably, pages are enclosed in suitable vinyl envelopes. Normally, when the booklet is opened, the right hand page displays a segment of the strip chart and the left-hand page displays navigation leg information.

16.3.11. Mission Forms and Logs. Local overprint of the following forms is authorized.

16.3.11.1. AF Form 4093, **Pilot's Information**. The planning staff will complete the Pilot's Information sheet.

16.3.11.2. AF Form 4053, **Low Level Flight Plan and Log**. An AF Form 4053 should be used when planning tactical low level missions. A MAJCOM approved computer generated flight plan may be used in lieu of the AF Form 4053.

16.3.11.3. AF Form 4051, **Pilot's Low Level Airdrop Plan**. Pilots will complete and use AF Form 4051 for all low-level airdrop/airland missions. A log or stick diagram containing the same information or an aircrew flimsy page containing this information may be substituted for the AF Form 4051.

16.3.12. Aircrew Flimsy. Aircrew flimsies are a standardized collection of essential operational information required by aircrews to complete mission planning, conduct route study, fly the mission, and comply with post-mission ground procedures and debriefing requirements.

16.3.13. Route Study. Crew route study is mandatory before accomplishing flight in the low level environment. An intensive review of the ingress, objective area, and egress routing by the entire crew leads to superior crew coordination and safe mission execution. Aircraft turns planned into higher terrain, critical obstacles that do not meet three engine climb performance, terrain analysis, threat locations, terrain masking and tactics must be discussed. Special emphasis should be placed on the run-in and objective area for the locations of visual and radar features, which will assist, in proper identification. The importance of route study cannot be overemphasized.

16.3.14. Tactical Aircrew Coordination. Effective crew coordination is crucial to the success of any flight, especially during combat aerial delivery operations, and will be discussed prior to executing the mission. A convenient time for the entire aircrew to discuss who is going to do or say what during each phase of the mission is during route study and/or the mission briefing. Assigning specific in-flight duties, such as who is going to fly the drop and what threat lookout calls are expected, will reduce confusion at the wrong time. While there is no clear cut definition of crew coordination, the concept deals with the ability of the aircrew to handle a rapidly changing environment and successfully perform the task at hand. This requires maintaining a high level of situational awareness through the crossflow of information between various crew positions. Information should be relative, accurate, complete, timely, and concise, particularly for the objective area and threat reaction maneuvers. Crew coordination discussions should also encompass individual technique, limitations, emergency procedures, and previous lessons learned.

16.3.15. Final Review. As both a final and on-going step, planners and aircrews should conduct "what if" sessions to detect and solve potential problem areas (e.g., aircraft aborts, recall procedures, weather deterioration, breakdown in various parts of the plan, unscheduled resistance, secondary mission objectives, etc.). "What ifs" must be planned and briefed as thoroughly as the primary scenario. Additionally, limiting factors which impact mission accomplishment and aircrew survivability should be addressed and briefed to the appropriate chain of command. Document "what ifs," limiting factors, planning and aircrew concerns in Section J (Miscellaneous) of the mission planning folder.

16.4. Airlift Support Forces Coordination. Ensure airlift and supporting forces have coordinated and present the following information in the briefing:

16.4.1. Airlift and support forces takeoff times.

16.4.2. Rendezvous location, altitude, and times.

16.4.3. Courses of action if airlift is late.

16.4.4. Course of action if support elements are late.

16.4.5. Airlift ingress and egress routes.

16.4.6. TOT/TOA and DZ /ALZ (including alternates).

16.4.7. Call signs.

16.4.8. Radio frequencies, radio silence procedures, chattermark procedures, and authentication procedures.

16.4.9. Airlift formation geometry.

16.4.10. Method(s) support aircraft will use to transmit threat warnings.

16.4.11. Areas of ground CAPS and EW support coverage (including times of coverage).

16.4.12. Communication with AWACS.

16.4.13. Electronic warfare support procedures (if any).

16.5. Briefings.

16.5.1. Mission Planning Pre-Brief. The purpose of the mission planning pre-brief is to familiarize all crewmembers with general aspects of the mission. The group or squadron commander, combat support group staff specialists, all crewmembers of each participating crew, and other personnel concerned with the mission should attend. The mission planning pre-brief may include all information pertinent to the mission and eliminate the need for later specialized briefings. In cases where highly specialized information or techniques require additional explanation or review (such as formation procedures), schedule a specialized briefing. During the briefing, indicate what preparation has been accomplished and what is yet to be accomplished. Use the following as a guide in conducting a briefing:

16.5.1.1. Security classification and roll call for the briefing and mission.

16.5.1.2. Purpose of the mission, forces required (to include number of aircraft) and a statement of mission requirements in sufficient detail to ensure all crewmembers understand all the information.

16.5.1.2.1. Operations plan

16.5.1.2.2. Ground objectives

16.5.1.2.3. Supported forces requirements: in-flight rigging, SATCOM, FM radio, alibi decision matrix (who decides to re-attack and when), secondary objectives, etc.

16.5.1.3. Mission Requirements:

16.5.1.3.1. Crew composition

16.5.1.3.2. Crew alerting and reporting

16.5.1.3.3. Minimum ground times

16.5.1.3.4. Crew duty times

16.5.1.3.5. Command waivers

16.5.1.3.6. Rules Of Engagement (ROE)

16.5.1.3.7. EMCON level directed for each phase of flight

16.5.1.4. Intelligence information (AF and Joint Services)

16.5.1.5. Weather information

16.5.1.6. Timing and control times to include:

16.5.1.6.1. Stations, start times, taxi, and takeoff

16.5.1.6.2. Force Rejoin, ARCT, TOT and TOA

16.5.1.6.3. Landing time

16.5.1.7. Review taxi, takeoff, and departure plans to include communications requirements and frequencies.

16.5.1.8. Navigation and altitude reservation flight plan

16.5.1.9. Air refueling information and procedures

16.5.1.10. Threat, special mission tactics

16.5.1.11. Cargo load information

16.5.1.12. Recall and diversion procedures

16.5.1.13. Recovery and alternate base

16.5.1.14. Announcements to include technical order status and changes, flying safety, specialized briefing times and locations, debriefing and interrogation location and procedures, messing, transportation, personal equipment, radio, and communications procedures and crew questions.

16.5.2. Pre-Deployment Briefing. Prior to deployments, the operations officer, mission commander, or designated representative should assemble the crew and brief description and purpose of the mission, tentative itinerary, aircraft configuration, special equipment, fuel load, clothing required, anticipated housing and messing facilities, sufficient money to defray individual's anticipated expenses, personal equipment/field equipment requirements, special clearance requirements, and flying safety.

16.5.3. Joint Mission Briefing or Mission Briefing. Joint representation is desirable when more than one service is participating. Briefings should be clear, concise and provide only mission essential information. Requirements of particular missions will determine sequence and content of individual briefings. AMCMAN 11-211 provides a recommended outline. Planners should adjust the format and extract (or add) items to conform to specific mission profiles. Conduct after each individual crew member has completed their mission preparation. All crewmembers will be present unless excused by the mission commander. Crewmembers not present must be briefed by the AC prior to takeoff. The mission commander, or mission planning staff, must re-brief the mission when the time interval from initial aircrew briefing to mission takeoff exceeds 72 hours.

16.5.4. Tactical Mission Briefing. Required if applicable items are not briefed in the Joint Mission Briefing/Mission Briefing. A mission briefing for participating pilots, navigators, and other personnel as directed by the mission commander, is required prior to all low-level and formation missions. Brief applicable items in sufficient detail to ensure clear understanding of mission objectives and procedures. The AC is responsible for ensuring all crewmembers are briefed on applicable mission items.

16.5.5. Specialist Briefing. Conduct specialist briefings to detail operating procedures or special interest items. The mission commander determines the requirement for this briefing. When appropriate, hold specialist briefings at the completion of the Tactical Mission Briefing for ACs, navigators, loadmasters, aeromedical personnel, jumpmasters, assault zone control officers, STT and DZST personnel.

16.5.6. Serial Lead Briefing. The serial leader will assemble all pilots and navigators participating in his serial to cover any changes or additions arising after the formal mission briefing. Only applicable items need be briefed. Conduct this briefing as appropriate, to allow sufficient time to complete necessary aircraft inspections and jumpmaster, loadmaster, or parachutist briefings before station time. **Chapter 19** contains specific briefing items.

16.5.7. Other Briefings. In addition to the briefings above, mission participants will also conduct briefings as required in Section 6.12. of this AFI. These include C2 Center Briefing, AC Briefing, Specialized Briefings (Airdrop, Air Refueling, Load Briefing, etc.), Weather Briefing, Intelligence Briefing and Hazardous Materials Briefing.

16.6. Mission Debriefings. Hold immediately after the mission if practical and include the following:

16.6.1. Aircrews should attend the operations and maintenance debriefings as directed by unit or mission commander. Maintenance debrief should be conducted ASAP after flight.

16.6.2. Intelligence debriefings must be accomplished as soon as practical after mission recovery, normally within 30 minutes. Debriefings will be as prescribed in USTRANSCOMR 200-3, **Intelligence Debriefing and Reporting**.

16.6.3. Aircrew Debrief. Mission critiques and debriefings are perhaps the most important learning tool available to aircrews and will be done after each mission. All crewmembers should attend. Use this time to review the entire mission. This is the time to learn. Undue concern about crewmembers' feelings may prevent them from learning something that may save future missions. The critique must be done objectively. Bring out the positive as well as the negative. Review techniques, offer suggestions for improvement, and correct mistakes.

16.6.4. For formation flights, a post-mission debrief should be conducted by the mission commander or formation leader.

Chapter 17

AIRLAND EMPLOYMENT

17.1. General. Tactical airland operations play a significant role in moving and resupplying ground forces. Use these procedures and the flight manual when operating into airfields or assault landing zones (ALZ). In a threat situation, crewmembers must understand their limitations and those of their equipment. The procedures contained herein are not all encompassing. Therefore, aircrews should use good judgment and sound airmenship to success-fully accomplish the mission.

17.2. Passengers on Tactical Flights.

17.2.1. Passengers are allowed, including Space-A passengers, on any flight, single ship or formation that:

17.2.1.1. Is not air dropping or conducting NVG operations on that sortie.

17.2.1.2. Meets the provisions of AFJMAN 24-204 concerning passengers with hazardous cargo.

17.2.1.3. Is not prohibited by international agreement.

17.2.1.4. If on a SAAM, the user does not object to Space-A passengers.

17.2.2. Personnel, i.e., crew chiefs, tasked to support JA/ATT airdrop and/or airland operations are allowed on airdrop missions.

17.2.3. The AC will report the number of seats available to aerial port/passenger terminal. Passengers will be briefed by passenger service personnel and may refuse transportation on tactical missions due to potential roughness of the flight at no loss to their order of priority for movement.

17.3. Airfield and ALZ Requirements. Markings required for assault landing zones are depicted in AFI 13-217. These markings are desirable for tactical airland operations; however, on hard surfaced runways that are permanently marked or lighted to make the touchdown zone and runway distances readily identifiable or, if the tactical situation does not permit, full markings are not mandatory. Communications and navigational aids provided by STT or TALCE are based on the operational requirement, capability, and threat environment.

17.4. Airborne Radar Approach (ARA). Use the following guidance when planning ARAs:

17.4.1. Day VMC. Plan a minimum of 300 feet AGL (if approved) modified contour altitude above the terrain using visual references from the IP to a point where the approach begins. If a high approach is used, mark a start climb point.

17.4.2. Night VMC. ARAs will be planned for all night VMC tactical LZ operations. Plan ARAS according to **Chapter 11**.

17.4.3. IMC. Except for contingencies, ARAs conducted in IMC must use approach plates published by the Defense Mapping Agency Aeronautical Center (DMAAC) or approved by MAJCOM. During contingencies, the MAJCOM DO/XO, or DIRMOBFOR may approve IMC ARA approach plates. Units must comply with any restriction in FLIP or the host nation agreement, and receive written approval from ATC and airspace management authority.

17.5. Rear Vision Devices (RVDS).

17.5.1. The RVD will only be installed in the forward overhead escape hatch. Units will comply with the following procedures when conducting RVD operations:

17.5.1.1. RVD training is restricted to authorized tactical training/exercise missions only.

17.5.1.2. Avoid use of the RVD in areas of medium or high bird concentrations.

17.5.1.3. When possible, plan training missions to avoid terrain that birds congregate near: shoreline, marshes, and large bodies of water

WARNING**:** Birds pose a potentially significant hazard to the RVD observer. Aircrews should consider the bird hazard potential when deciding to utilize the RVD.

17.5.1.4. Crews must plan and brief stop-use ROE for the RVD during mission planning.

17.5.1.5. Crewmembers must wear helmets at all times while in the RVD.

WARNING: Sitting with full weight on the folding portion of the upper crew bunk during high G maneuvers should be avoided due to potential overstress or breakage of the folding hinge, resulting in possible injury. A 5,000-pound tiedown strap should be used to reinforce this portion of the upper bunk.

WARNING: The RVD observer will inform the pilot about terrain clearance when possible, especially during turns.

NOTE: The pressurized RVD (Universal Technologies, Inc. Part Number UCI1301993) is approved for pressurized flight at all altitudes.

17.5.2. RVD in-flight installation.

17.5.2.1. Pressurized RVDs will be installed prior to flight.

17.5.2.2. Non-pressurized RVDs may be stowed and installed in-flight if mission requirements dictate (high-low profile).

WARNING: Hazards associated with rapid suction of the RVD into the hatch opening and resulting personal injury or scratching/damage of the Plexiglas. Wear gloves, keep hands and fingers clear of edges at all times during in-flight installation.

WARNING: Do not attempt to pressurize the aircraft with the RVD installed unless a pressurized RVD is used.

17.5.2.3. Perform the following steps for in-flight installation. Crewmembers must be familiar with installation prior to flight.

17.5.2.3.1. Holding the RVD by both handles, carefully place the pin into the back of the hatch mount.

17.5.2.3.2. Slowly ease the RVD upward.

17.5.2.3.3. As the RVD extends outside the airframe, the draft will rapidly and forcefully suck it all the way into the hatch opening.

17.5.2.3.4. Secure the latch to lock the RVD into place.

17.5.3. Tactics and techniques for proper use of the RVD can be found in AFTTP 3-1V25, *Tactical Employment - C/HC-130.*

17.6. Energy Management. Carefully consider performance data and energy management when planning tactical low level operations, particularly in mountainous terrain at heavy gross weights or with less than full engine capability. Failure to manage energy levels may cause a stall or require a go-around. Consideration should be given to planning increased airspeeds, 230-240 KIAS vs. 210 KIAS. Another accepted technique is to calculate and have visible to both pilots stall speeds for 0, 30, and 60 degrees of bank and 3-engine service ceiling.

WARNING: Uncoordinated flight reduces stall margins and can cause an abrupt departure from controlled flight.

CAUTION: Uncoordinated flight increases airframe structural loading and should be avoided unless an actual threat exists.

17.7. Navigation.

17.7.1. Threats and emission control requirements permitting, use all available aids (e.g. map reading, SCNS computer, and tactical air navigation) to remain position oriented.

17.7.2. Crewmembers share responsibility for enroute navigation, terrain avoidance, and time control. During low-level operations, attention should be focused outside the aircraft, emphasizing threat detection and situational awareness. Limit duties, which distract attention from outside the aircraft to mission essential items only.

17.8. Tactical Arrivals.

17.8.1. Low Altitude Arrivals (**Figure 17.1.**). These approaches are used primarily when a low altitude ingress is necessary, e.g. avoidance of early warning radar coverage or radar-guided surface to air missiles (SAM) near the airfield. All maneuvering is done at low altitude. These approaches can be entered from any direction at enroute altitude and airspeed. These maneuvers may be flown on continuation training and operational missions with passengers aboard.

17.8.1.1. Straight In. This approach appears the simplest, but may be the most difficult to execute consistently. The lack of turns means the energy dissipation problem is one dimensional, making the timing of slowdown critical. The key to a successful approach is timing slowdown to obtain the proper configuration. Approximately 3 NMs are required to slow from 200 KIAS to threshold speed. From 250 KIAS, plan on 4.5 to 5 NMs. Tail winds or increased gross weights require an even earlier slowdown. This approach may be varied by using an angling final, a dog leg, or an entry to base using the same basic techniques.

17.8.1.1.1. Advantages:

17.8.1.1.1.1. Requires very little low-level maneuvering.

17.8.1.1.1.2. Minimum exposure to the threat environment.

17.8.1.1.2. Disadvantages:

17.8.1.1.2.1. Aircraft slows further from airfield than other types of approaches.

17.8.1.1.2.2. Precise navigation is critical to finding the runway.

17.8.1.2. Curvilinear Approach (Random Shallow). The random shallow approach is a low altitude (250 to 500 feet), high speed, VMC maneuver. It is designed as an alternate method to approach an airfield when the primary threat is from radar-guided weapons or large caliber AAA.

17.8.1.2.1. Performing the Maneuver.

17.8.1.2.1.1. For a straight-in (**Figure 17.1.**), a level slowdown from 250 KIAS to 120 KIAS takes approximately 4.5 NM; from 200 KIAS to 120 KIAS, it takes approximately 3.0 NM. These distances assume the aircrew configures "on airspeed to landing configuration" and allows approximately 0.5 miles at threshold airspeed. This approach appears at first glance to be the easiest but may in practice be the most difficult to execute consistently. The keys to a successful approach are initiating it at the correct time and getting configured on speed. Entry airspeed is critical. Since energy is proportional to the square of velocity, a small increase in entry airspeed can make the difference between a landing and a go around. It will take at least 3 NM to slow from 220 KIAS. From 250 KIAS, plan on 4.5 to 5 NM.

17.8.1.2.1.1.1. Advantages:

17.8.1.2.1.1.1.1. No low-level maneuvering required.

17.8.1.2.1.1.1.2. Minimum exposure to threat environment.

17.8.1.2.1.1.2. Disadvantages:

17.8.1.2.1.1.2.1. Slow airspeed throughout approach. Slowdown is initiated further from airfield than other types of approaches.

17.8.1.2.1.1.2.2. Aircraft is easily recognizable, if seen.

17.8.1.2.1.1.2.3. Possibility of high sink rates close to the ground, with low power settings.

17.8.1.2.1.1.2.4. Slowdown timing and entry parameters are critical.

17.8.1.2.1.1.2.5. Navigation is critical since the assault landing zone is only 60-feet wide from head-on and acquisition is more difficult.

17.8.1.2.1.2. The teardrop approach variation. The teardrop (**Figure 17.1.**) is very similar to a circling approach to the opposing runway; the primary difference is that the random shallow is entered at enroute airspeed rather than fully configured with energy dissipating throughout the approach. In addition, a 300-feet pattern altitude is somewhat lower than most circling approaches. Start slowing down about 1 NM from the approach end, with 30 degrees displacement from the runway axis. Turn base when the aircraft is even with the landing threshold.

17.8.1.2.1.2.1. Advantages:

17.8.1.2.1.2.1.1. Pattern is flexible enough to allow adjustments to manage energy and still stay within close proximity to the airfield.

17.8.1.2.1.2.1.2. Allows conversion from a straight-in to the opposite runway while maintaining ingress airspeed until close proximity to the airfield.

17.8.1.2.1.2.1.3. LZ acquisition is about the same as a straight-in, but less precision is needed due to a more flexible pattern.

17.8.1.2.1.2.2. Disadvantages:

17.8.1.2.1.2.2.1. Maneuvering at low altitude and airspeed.

17.8.1.2.1.2.2.2. The usual "picture" is likely to result in too tight of a pattern and an overshoot.

17.8.1.2.1.3. The Abeam Approach Variation. The abeam approach (**Figure 17.1.**) offers flexibility and keeps the aircraft as close to the field as any of the others. Approach from abeam the runway sets the aircrew up for landing in either direction and allows reconnaissance of the field as it is flown over. The key parameters are field crossing at 220 KIAS, initiate base turn at not more than 150 KIAS, flaps set to 50 percent, and landing gear in transit. If the pattern is entered with more than 220 KIAS, a downwind extension is likely.

17.8.1.2.1.3.1. Advantages: Ingress airspeed maintained until over the airfield; Easily adapted to landing either direction; Constant turning degrades the aircraft as a target; The airfield is approximately 0.5 miles wide when approached from the beam, reducing the precision required for navigation.

17.8.1.2.1.3.2. Disadvantages: LZ acquisition may be more difficult, particularly for dirt strips or austere fields without adequate ground references; Considerable maneuvering in close proximity to the ground with decaying airspeed. Possible loss of position awareness during turn to downwind; visual contact may be lost passing the runway.

17.8.1.2.1.4. The Spiral Approach Variation. A variation to the abeam approach is the spiral approach. The spiral approach allows pattern entry at maximum airspeed but requires planning to ensure entry is within the required parameters. The pattern is a continuous energy decay maneuver, and each of the previous patterns is included in the spiral. The pattern allows a depletion of energy and the ability to land in the absolute minimum time. The key parameters for this approach are offsetting the aircraft 1 NM abeam the touchdown zone at 250 KIAS, crossing the runway at 90 degrees and 220 KIAS, and 150 KIAS with flaps 50 percent and gear in transit before starting the base turn.

17.8.1.2.1.4.1. Advantages: Maintains higher airspeed until very close to the airport; Constant turning while changing airspeed and configuration degrades the aircraft as a target and provides flexibility for energy management.

17.8.1.2.1.4.2. Disadvantages: Maneuvering close to the ground; Possible loss of position awareness as the runway passes to the 6 o'clock position; and pattern entry point is difficult to determine.

17.8.2. High Altitude Approaches (**Figure 17.2.**). These approaches are used primarily when a high or medium altitude ingress is necessary (e.g., small arms environment and a permissive high or medium altitude threat environment exists), thus allowing some reconnaissance of the field as you fly over. Initial altitude, airspeed, and heading are based on the threat. These maneuvers may be flown on continuation training and operational missions with passengers aboard.

17.8.2.1. Overhead. Break as the tactical situation permits with approximately a 45 degree angle of bank and retard the power to flight idle after the bank is established. Make a level turn to downwind with power reapplied as necessary to maintain 150 KIAS. Maintain 140 KIAS (or approach speed if higher) until wings level on final.

17.8.2.1.1. Advantages: Expedites arrival; Keeps airspeed high until overhead the airfield.

17.8.2.1.2. Disadvantage: Aircraft is easily observed.

17.8.2.2. Random Steep. The random steep approach (**Figure 17.2.**) is a high altitude maneuver, conducted in VMC. It is designed as an alternate method to approach an airfield when small arms are the primary threat and the field perimeter security is limited (usually 1 to 3 miles radius) or when terrain does not permit a normal traffic pattern.

17.8.2.2.1. Advantages: Rapid descent to reduce exposure time; Continuous turns and descent may compound tracking; and over-flight of the threat area is minimized.

17.8.2.2.2. Disadvantage: Requires careful pre-planning to perform properly.

17.8.2.2.3. Plan slowdown for configuration approximately 4 miles from the break. Remember to use actual ground speed and drift at altitude.

17.8.2.2.4. Prior to the break, select prominent ground features to aid in staying within the "protected" airspace when the runway is not in sight. Additionally, get the picture of altitude versus runway length. Remember, a 6,000 feet strip at 10,000 feet AGL could look the same as a 3,000 feet strip at 5,000 feet AGL.

17.8.2.2.5. Review the low key or final base turn MSL altitude. As a technique, add field elevation plus 2,000 feet.

17.8.2.2.6. Review flight characteristics and Dash 1 limitations.

17.8.2.2.7. Wings level descent at 140 KIAS is about 2,500 fpm.

17.8.2.2.8. Configured, at 140 kts, 45 degrees of bank, the turn radius is charted at 1,900 feet, which means that the aircraft should be no farther from the runway centerline than 3,800 feet (.625NM). In addition, the aircraft is turning at a rate of 7.5 degrees per second, which means that a 180-degree turn will be completed in 22 seconds. During that interval, the aircraft will descend at least 1,650 feet. See **Figure 17.2.**.

17.8.2.2.9. Turn radius for 30 degrees of bank is about 3,200 feet with a rate of turn of approximately 4.5 degrees per second. A 360-degree turn will lose approximately 3,700 feet (90 seconds at 2,500 fpm).

17.8.2.2.10. Plan roll out on final between 0.5 and 1 mile at approximately 300 to 600 feet AGL. This will provide a comfortable glide path.

17.8.2.3. Selection of Maneuver. The desired outcome of the random approach is to place the aircraft on final (never less that 300 feet and 0.25 miles from the runway) wings level, above threshold speed so that a safe landing may be executed. The most common type of approaches include the following.

17.8.2.3.1. A modified 360-degree turn initiated at 4,500 feet AGL and 140 KIAS.

17.8.2.3.2. A 270-degree turn to base and 140 KIAS.

17.8.2.3.3. An opposite direction approach initiated at 3,500 feet AGL and 140 KIAS.

17.9. Tactical Departures.

17.9.1. Low Altitude Departure. This departure is used when a low altitude escape is necessary, e.g. avoidance of early warning radar coverage or radar-guided SAMs. Accelerate to enroute airspeed while climbing to enroute altitude and turn to departure heading.

17.9.2. High Altitude Departure. This departure is used when a high or medium altitude escape is necessary, e.g. small arms environment and a permissive high or medium altitude threat environment exists. Fly a climbing spiral at 140 KIAS or 50-percent flap approach speed whichever is higher. Upon reaching a safe altitude, retract the flaps, accelerate, and continue climb at charted climb speeds. Actual time to climb will increase proportionally with bank angle. Therefore, use the minimum bank angle required to remain within the confines of the field boundary speed with flaps 50-percent.

Figure 17.1. Low Altitude Approaches.

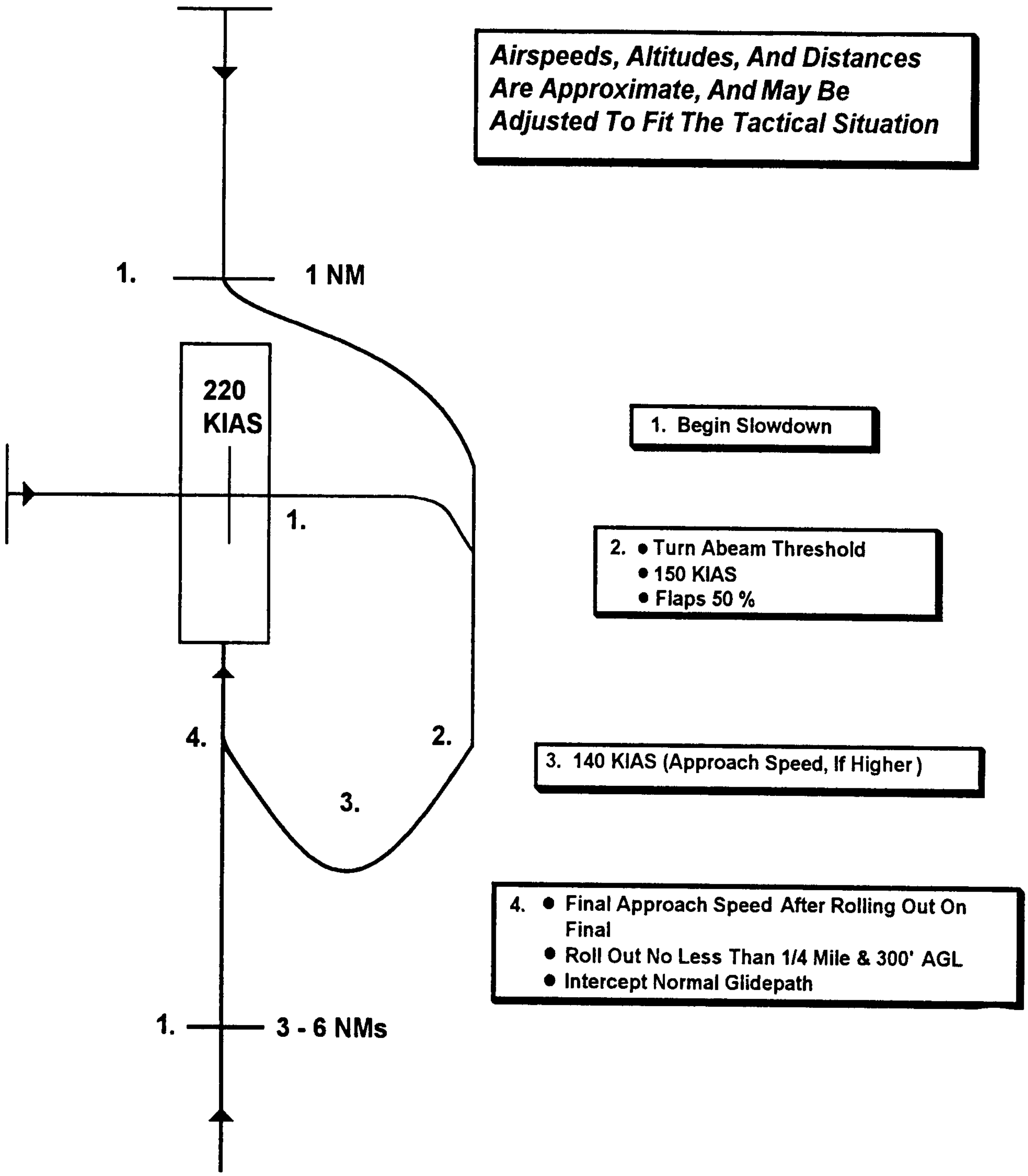
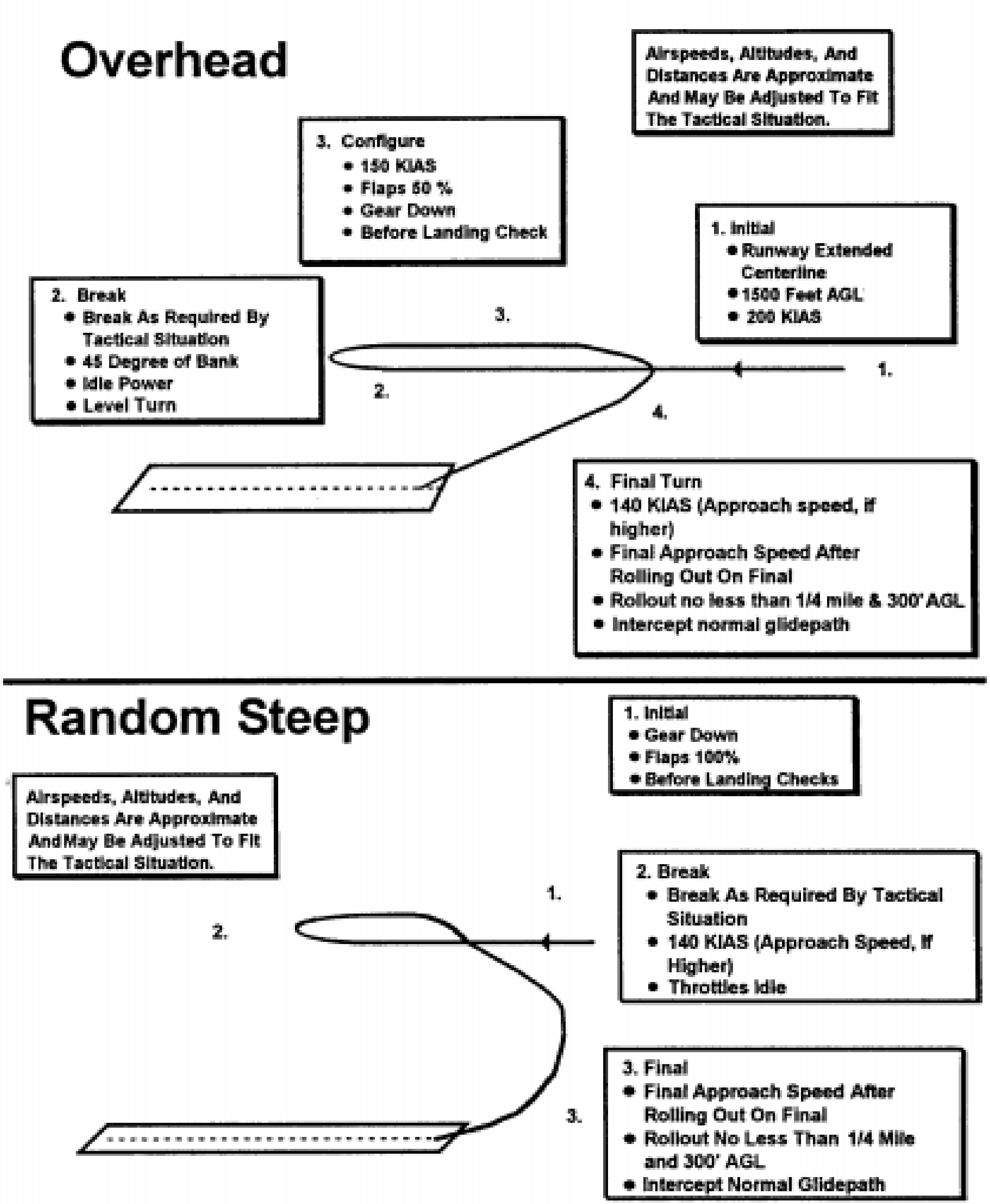


Figure 17.2. High Altitude Approaches.



17.10. Tactical Ground Operations. This section outlines procedures to follow when conducting specific ground operations. Crews should spend the minimum amount of time on the ground when accomplishing engine running onloads/offloads or combat offloads. Preparation and a thorough briefing enhances the ability to operate quickly and safely. Brief appropriate ground personnel and subsequent aircrews on unexpected hazards encountered during takeoff or landing (e.g. dust, winds, and hostile activity). If engines are to be shutdown an accepted technique is to position the aircraft and "cuff" one propeller before engine shutdown to permit a buddy start if the gas turbine compressor (GTC) or auxiliary power unit (APU) fails at fields where ground power is not available. If possible, park in a spot that allows exit via two or more taxi routes.

17.11. Engine Running Onload and Offload (ERO) Procedures. Use ERO procedures when necessary to expedite aircraft or cargo movement, meet time requirements of unit moves, joint training exercises, and contingencies or enhance crew duty day. The aircraft commander is responsible for prior coordination with TACC or the controlling agency for early takeoffs. With the exception of small arms ammunition (Hazardous Class/Division 1.4), do not use ERO procedures when explosive cargo is involved unless authorized in the JA/ATT, exercise operation or contingency air tasking order. ERO procedures may be used for any mix of personnel or cargo. Material handling equipment should be used if palletized cargo is to be onloaded or offloaded. Aircraft commanders must assess prevailing weather, lighting and parking location to ensure safe operations.

WARNING: Do not onload or offload through the crew entrance door and cargo ramp and door at the same time. Paratroop doors will not normally be used.

NOTE: A ramp support/milk stool will be installed when on/offloading pallets weighing more than 2,000 pounds.

NOTE: At their discretion, ACs may ERO any category of passenger. The number of passengers and amount of baggage to be onloaded or offloaded should be taken into consideration. The well being of the passengers should be considered at all times.

17.11.1. General Procedures.

17.11.1.1. ACs will brief crewmembers on the intended ERO operation.

17.11.1.2. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio.

17.11.1.3. As a technique, operate engines in low speed ground idle, lower flaps (or position as required), to reduce prop blast aft of the aircraft.

17.11.1.4. Use wing leading edge and taxi lights to enhance safety at night as the situation dictates.

17.11.1.5. Station another crew member on interphone or public address (PA) in the cargo compartment as safety observer. Safety observers will remain forward of all cargo.

17.11.2. Offload Preparation/Procedures. Aerial delivery support (ADS) arms may be disconnected during descent checklist. Prior to landing, the loadmaster will brief all personnel in the cargo compartment regarding their locations, duties, and responsibilities during the ERO.

17.11.2.1. Brief drivers on the following items:

17.11.2.1.1. Exact offload procedures and applicable signals to be followed.

17.11.2.1.2. When cleared by the loadmaster, to assume their position. Actuate brake pedal sufficiently to ensure brakes are operational. Vehicles requiring a build-up of air pressure to provide brake pressure must delay pressure build-up until engine start.

17.11.2.1.3. Vehicle engines are not to be started until the aircraft comes to a complete stop, cargo ramp and door are open, and only when directed by the aircrew loadmaster.

17.11.2.1.4. Vehicle parking brakes will not be released until all restraint is removed and cleared by the aircrew loadmaster.

17.11.2.1.5. Vehicles will proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping.

17.11.2.2. Brief troops on the following items:

17.11.2.2.1. Secure baggage aboard vehicles, if applicable.

17.11.2.2.2. Deplane when directed by the loadmaster.

17.11.2.2.3. Proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping.

17.11.3. After the aircraft is slowed to taxi speed, the loadmaster may remove all tiedowns except one forward and one aft restraint, open the aft cargo door, and lower the ramp to approximately 12 inches above horizontal.

WARNING: If a combat offload of pallets is to be accomplished before offloading vehicles, do not remove any vehicle restraint until after the combat offload is complete.

17.11.4. After clearance from the pilot, the loadmaster lowers the ramp, and clears off headset to direct onload or offload operations.

17.11.4.1. The loadmaster will direct all onload and offload operations using pre-briefed signals. Other qualified loadmasters (TALCE, aerial port) may perform these duties however, the aircrew loadmaster retains overall responsibility for the operation.

17.11.5. Personnel on/offload through the aft cargo door and ramp.

17.11.5.1. Passengers will be escorted by a crewmember or qualified TALCE, aerial port, or airfield control (e.g. STT) personnel when enplaning or deplaning through the aft door and ramp.

17.11.5.2. Auxiliary ground loading ramps should be used.

17.11.5.3. Unless cargo size and location dictate otherwise, deplane passengers before cargo, and enplane after cargo.

17.11.6. Personnel onload and offload through the crew entrance door:

17.11.6.1. Station a crewmember (normally the loadmaster) on interphone with cord held taut at approximately 20-feet at an angle of 45-degrees from the aircraft axis.

17.11.6.2. Brief deplaning personnel to secure loose articles and remain forward of the interphone cord.

17.11.6.3. No enplaning personnel should approach the airplane until the loadmaster is in place.

NOTE: If downloading to an empty aircraft, a DD Form 365-4 is not required for the subsequent sortie.

17.11.7. Upload Preparation/Procedures. Review the passenger and cargo manifests, crew lists, and complete DD Form 365-4, **Weight and Balance Clearance Form F-Transport/Tactical**, for the subsequent sortie.

17.11.7.1. Loadmasters may use the load plan total weight and load center of balance (CB) for entry on the DD Form 365-4 provided these procedures are followed:

17.11.7.1.1. The load plan data must be checked and validated by a qualified load plan validator i.e., aircraft loadmaster, aerial port specialist, or any individual who has completed the AMC Affiliation Program Airlift Planners Course.

17.11.7.1.2. The load plan validator will legibly sign the signature block on the load plan with name, rank, and organization.

17.11.7.1.3. The load must be placed on the aircraft exactly according to the load plan.

17.11.7.1.4. Prior to flight, if there is any doubt by loadmasters on the accuracy of the load plan weight or CB, then he or she must accomplish the DD Form 365-4 by station loading each individual item.

17.11.8. After completion of onload or offload, secure the ground loading ramp(s) in the installed position (if mission dictates), in the cargo compartment, or stow them in the aft cargo door.

17.11.9. AE Engines Running Onloads. For AE missions requiring engine running onloads, see **Chapter 20**. Engine running offloads are not required during AE missions.

17.11.10. Resume taxi after coordination with the loadmaster.

CAUTION: Ramp should be raised to approximately 12-inches above the horizontal position prior to taxi.

17.12. Loading of Rucksacks. Rucksacks may be floor loaded, loaded in vehicles or on pallets. Units being moved must allocate adequate space on the load plan and aircraft for floor loading. In all cases an unobstructed path must be maintained to evacuate the aircraft during an emergency.

17.12.1. Floor loading may increase loading or unloading times and may require more space, which may reduce the number of personnel or equipment airlifted.

17.12.2. During tactical deployments into a forward operating base/operations base (FOB/OB), rucksacks will be carried by the individual onto the aircraft.

17.12.3. For flights of less than one-hour duration, the following procedures apply for tactical deployments:

17.12.3.1. The seat back will be loosened to accommodate extra bulk and troops will wear the rucksacks in the seat.

17.12.3.2. Use 24 inch spacing or seat five troops in six seat locations using 20 inch spacing. Normally, a maximum of 62 troops may be carried.

17.12.3.3. All troops must have quick release straps on their rucksacks.

17.12.3.4. Troops will be briefed to leave their rucksacks on the seat if an emergency evacuation is necessary.

WARNING: Ensure seat webbing adjacent to the side emergency exits is not loosened to the extent that the troop's clothing/equipment will contact and possibly unlock side emergency exit handle.

17.12.4. The following procedures apply to transporting hazardous materials in rucksacks:

17.12.4.1. Personnel will only be permitted to carry their basic combat load or individual issue of hazardous material when they will engage an enemy force immediately upon arrival.

17.12.4.2. Personnel may retain small arms ammunition (cartridge for weapons, DOT 1.4) and nuclear, biological, and chemical equipment as long as it is retained in a carrier (i.e., bandoleers, pouches, and bags).

17.12.4.3. Munitions and other hazardous material placed in rucksacks, field packs, or other authorized containers, removed from their shipping container, must be adequately protected from accidental functioning.

17.12.4.4. For airland troops and airdrop troops who are not rigged prior to takeoff, all carriers will be consolidated in one central location on the aircraft (as directed by the loadmaster) and distributed to personnel prior to airdrop or after landing as required. Paratroopers rigged prior to takeoff may retain individual carriers containing hazardous materials.

17.12.4.5. The troop commander or load team chief will brief the loadmaster concerning the individual issue of hazardous materials.

17.12.4.6. Hazardous materials identified for sustainment must be prepared and certified according to AFJMAN 24-204.

WARNING: Under no circumstances will the Flameless Ration Heaters (FRH), included in MREs, be removed from rucksacks or handled inside the aircraft. If activated, the FRH will become extremely hot and may cause personal injury.

17.13. Combat Offload Procedures. Combat offload provides a means of offloading single, multiple, and married pallets, airdrop platforms, or container delivery system (CDS) containers without the use of material handling equipment. The controlling C2 commander, MAJCOM DO/XO or the commander, DIRMOBFOR may authorize combat offload when conditions warrant. The method of combat offload will be determined by the aircrew based on the conditions at the offload site. Unit OG/CC may approve unilateral combat offload training.

17.13.1. Cargo pallets, airdrop platforms, and CDS containers can be offloaded without damage to the aircraft with the cargo ramp in the horizontal position. Use the following methods for combat offload operations.

17.13.1.1. Method "A" Use this method to offload single, multiple, ramp or married pallets, airdrop platforms, and CDS containers. Pallets, platforms, or CDS may be offloaded in a train like fashion or one-by-one as the situation dictates. Fragile items that might be damaged by combat offload will not be offloaded using this method without user concurrence.

WARNING: Many explosive items have specific "drop" criteria that, if exceeded, render the item useless or dangerous to the user. With the exception of small arms ammunition (hazard class and division 1.4), explosives and munitions shall not be combat offloaded without approval of MAJCOM/DO.

EXCEPTION: Explosives and munitions rigged for airdrop may be combat offloaded without MAJ-COM/DO approval.

CAUTION: A taxiway or ramp at least 500 feet long is required, however, 1,000 feet is desired to provide a margin of safety. When pallets, platforms, or containers are offloaded one at a time, use a longer taxiway based on the number to be offloaded.

NOTE: Combat offload of fragile and sensitive cargo items (i.e., computers) that might be damaged by standard method "A" combat offload procedures will not be attempted without user concurrence. If the nature of the mission dictates that cargo must be offloaded, aircrews may lower the ramp to approximately 18 inches above the ground.

17.13.1.1.1. Double or triple married pallets may be offloaded, without ballast, using this method provided their weight does not exceed 12,000 pounds, and the height of the pallets fall within cargo height jettison limit in section III of the flight manual or section V of the cargo loading manual.

17.13.1.1.2. Airdrop rigged platforms up to 24 feet in length may be offloaded, without ballast, using this method provided their weight does not exceed 12,000 pounds.

NOTE: Married pallets and airdrop rigged platforms over 12,000 pounds may be offloaded using this method, provided ballast or cargo equal to the difference between 12,000 pounds and the weight of the pallets or platforms (to be offloaded) remains in C through F compartments during offload. Example: A 17,000 pound married pallet or airdrop platform requires 5,000 pounds of ballast or cargo to remain in C through F compartments during the offload.

17.13.1.1.3. CDS bundles may be combat offloaded using this method. With the centerline vertical restraint (CVR), if the total weight of the bundles exceeds 12,000 pounds offload must be accomplished one side at a time. Without the CVR, if the total weight of the bundles exceeds 12,000 pounds bundles should be restrained in groups of four or less and offloaded one group at a time.

CAUTION: When using method "A" on excessively rough, sharply undulating, or battle-damaged surfaces, damage to the aircraft ramp may occur. Reducing forward taxi speed on these surfaces will reduce aircraft oscillation. The AC must determine if the offload area will permit the offload operation to be conducted without damage to the aircraft or equipment.

17.13.1.2. Method "B." Use this method to offload married pallets that do not fit the category for method "A" or for which no ballast is available for married pallets weighing between 12,000 to 15,000 pounds. Use four serviceable steel 55-gallon drums under each pallet to be offloaded. The correct number of steel drums needed to complete this type of offload must be available at the offload site or must accompany the load when conditions at the offload site are unknown.

WARNING: The maximum weight for pallets to be off-loaded across the ramp at any one time when using method "B" is 15,000 pounds for C-130E, and H aircraft.

WARNING: Do not use method "B" for airdrop-rigged platforms to prevent binding the platform under the vertical restraint rails.

17.13.2. Aircrew Procedures:

17.13.2.1. Prior to commencing combat offload operations, the pilot will brief each crewmember on the method to be used. Specific procedures are in the expanded checklist. The pilot will coordinate tasks.

17.13.2.2. All crewmembers participating in the offload will refer to the checklist. Report any problem to the pilot immediately.

17.13.2.3. If other individuals must be aboard to assist the crew in an unusual circumstance, give them a thorough safety and procedures briefing for the entire offload sequence.

17.13.2.4. A safety observer will take position at the bottom of the flight deck steps on interphone and PA and transmit warnings through all speakers of the PA system to help the loadmaster enforce all safety precautions.

17.13.2.5. The loadmaster will maintain constant interphone contact with the pilot and is the only crewmember authorized to operate the dual rail locks during combat offload operations.

WARNING: During the entire offload operation, no one is permitted behind or beside the load unless the loadmaster checks that all rail locks are locked and engaged in the pallet detents or secures' each pallet to aircraft tiedown rings to ensure positive aft restraint.

WARNING: Always maintain forward restraint with the right-hand locks.

17.14. Emergency Airlift of Personnel. The following procedures will apply to ensure a safe, efficient loading method for the emergency airlift of personnel from areas faced with enemy siege, hostile fire, for humanitarian reasons, or when directed by the C2 agency having operational control. See **Chapter 20** for emergency airlift of litter patients.

17.14.1. Emergency airlift normally will be accomplished without the use of individual seats or safety belts. The number of personnel seated on the cargo compartment floor will vary depending on individual size. Personnel may be loaded in groups of 12 to 16 (depending on size) to control loading operations. Ambulatory combat floor loading will not be performed on non-combat missions.

17.14.2. General Procedures:

17.14.2.1. When available, mattresses or other cushioning material may be used for seating.

17.14.2.2. When available, a pallet subfloor may be installed.

17.14.2.3. When a pallet subfloor is installed, or when the intermediate rollers are removed from the aircraft, use the rail rings for attaching the tiedown strap used for forward restraint and body stability.

17.14.2.4. When a pallet subfloor is not used, consider removing the intermediate rollers from the aircraft, mission conditions permitting.

17.14.2.5. When the intermediate rollers are not removed from the aircraft, secure them on the outboard rails.

17.14.2.6. Seat troops, passengers, and ambulatory patients facing forward.

17.14.2.7. Attach a tiedown strap for each row of personnel to provide forward restraint and body stability.

17.14.2.8. When the intermediate rails are stacked on top of the outboard rails, use floor rings for attaching the straps. In this situation, the available seating space is decreased, and the number of passengers must be decreased.

17.14.2.9. Secure baggage on the cargo ramp/floor. Excess baggage and cargo secured on the cargo ramp/floor will decrease the number of troops, passengers, and patients proportionately.

17.14.3. The maximum altitude for emergency airlift will not exceed FL250.

17.15. Amplified Checklists.

17.15.1. Combat Entry Checklist. Complete the checklist in **Table 17.1.**. before entering the threat environment. The checklist includes items to aid in survivability based on specific mission requirements. Each individual item may be accomplished before starting the checklist. Items coded with an asterisk (*) will be re-accomplished for subsequent routes.

17.15.2. Combat Exit Checklist. Use the checklist in **Table 17.2.** to return the aircraft to normal cruise configuration upon departing the combat environment.

17.15.3. Combat Offload Checklist. Use **Table 17.3.** to conduct combat offload. Use **Table 17.4.**, **METHOD "A"** to offload of single, multiple, ramp, or married pallets, airdrop rigged platforms, and CDS containers. ***NOTE*****:** In a hostile environment, the crew briefing may be performed prior to combat entry. Use **Table 17.5.**, **METHOD "B"** to offload married pallets which do not meet the requirements for Method "A" and for which no ballast is available for married pallets between 12,000 and 15,000 pounds.

Table 17.1. Combat Entry Checklist.

COCKPIT CREW	LOADMASTER
*1. **"CREW, COMBAT ENTRY CHECKLIST"** (N) *2. **"ACKNOWLEDGED"** (P,CP,E,LM) *3. Altimeters - **"SET (State Setting)"** (CP,P,N)	*1. **"ACKNOWLEDGED"** (P,CP,E,LM)
*4. Ingress/Egress -- **"REVIEWED"** (As required) (P,CP,N) 4.1. Review intentions, altitudes, airspeeds, crew coordination, threat locations, drift, run-in, and aircraft configuration, as required. 4.2. Compute and post stall speeds for 0 and 45 degrees bank with flaps at 0 and 50 percent on AF Form 4062, **C-130 Stall Speed Card**. 4.3. If performing a heavy equipment drop, compute and post Max Effort Takeoff Speed (Vmeto) for aircraft at airdrop weight.	
*5. Survival Equipment - **"DONNED"** (As required) (P,CP,E,N,L) All cockpit crewmembers will ensure the following equipment is immediately available and functional (as required): 5.1. Parachute 5.2. Survival Vest 5.3. Flak Vest 5.4. Chemical Defense Ensemble 5.5. Helmet and Oxygen 5.6. Life Preserver Units (LPU) 5.7. Weapons	*2. Survival Equipment - **"DONNED"** (As required) (LM) Ensure the following equipment is immediately available and functional (As required): 2.1. Parachute 2.2. Survival Vest 2.3. Flak Vest 2.4. Chemical Defense Ensemble 2.5. Helmet and Oxygen 2.6. Life Preserver Units (LPU) 2.7. Weapons **NOTE:** Personnel required to be mobile in the cargo compartment will don their helmets at this time if in a threat area. Otherwise, the helmet will be donned at the pre-slowdown checklist.
6. Fuel - Tank to Engine (As required) (E)	
*7. Pressurization - Depressurizing (As required) (E) 8. Dump Manifold - **"PURGED"** (As required) (LM,P) Pilot will cross control the aircraft to drain the manifold. **CAUTION:** Ensure defensive system PRG/MAN button is set to MAN during purging operations. **NOTE:** It is not necessary to purge the dump manifold on aircraft equipped with dump valve switches.	3. Dump Manifold - **"PURGED"** (Some airplanes) (LM,P) Verify the manifold is drained by visually checking each dump mast.

COCKPIT CREW	LOADMASTER
*9. Defensive Systems - **“ARMED”** (As required) (N)	*4. Cargo Compartment - Secure. Ensure all items (tiedown equipment, stanchions, overhead litter strap containers, baggage, etc.) are secure.
*10. EMI Filter/Safety Pins - **“REMOVED”** (As Required) (LM)	*5. EMI Filter/Safety Pins - **"REMOVED"** (LM) (As required) **NOTE:** Loadmaster will not remove pins until directed.
*11. Cockpit - Secure (E) Ensure all items are secure.	
*12. Radar Altimeter - **"SET (State Setting)"** (P,N) If a threat warrants, CARA may be turned off to reduce emissions.	
*13. GCAS/GPWS (If Installed) - **“SET”** (as required) (P/CP)	
*14. Unnecessary Equipment - **"OFF"** (P, CP, E, N). To reduce emissions turn off all nonessential items.	
*15. IFF - **"SET"** (As required) (CP)	
16. Synchrophase Master - OFF (As Required) (E)	
*17. Lookouts - **"CLEARED TO POSITION"** (As Required) (P) **NOTE:** Pilot will assign sectors to crewmembers for threat scanning.	*6. Lookouts - **"POSTED"** (As Required) (LM) **NOTE**: When actual threats are briefed, loadmasters will position when the engineer states "LOOKOUTS" and reposition when complete with other duties.
*18. Pressurization - No Pressure/Aux Vent/Manual Press (As required) (E) **NOTE:** Aux Vent may be selected once the aircraft is depressurized if the threat area does not contain a chemical, biological, or radiological (CBR) hazard.	
19. Bleed Air Valves/Regulators - (As Required) (E) **NOTE:** If the threat area contains a CBR hazard, close the engine bleed valves/regulators, select Manual pressurization, and close the outflow valve.	
20. Exterior Lights - **“SET”** (E)	
21. Interior Lights - **“SET”** (P,CP,E,N,LM) **NOTE:** Ensure cockpit lighting is set/taped for NVG operations (As Required)	7. Interior Lighting - **“SET”** (P,CP,E,N,LM) **NOTE**: Set interior lighting to minimum. Turn loading lights and wheel well lights (some airplanes) off during night operations.
22. NVGs - **“ON/READY”** (As Required) (P, CP, E, N, LM)	8. NVGs - **“ON/READY”** (As Required) (P,CP,E,N,LM)
23. Combat Entry Checklist**- “COMPLETE”** (LM, E)	*9. Combat Entry Checklist**- “COMPLETE”** (LM, E)

Table 17.2. Combat Exit Checklist.

COCKPIT CREW	LOADMASTER
1. **"CREW, COMBAT EXIT CHECKLIST"**(N)	1. **"ACKNOWLEDGED"** (P,CP,E,LM)
2. **"ACKNOWLEDGED"** - (P,CP,E,LM)	
3. NVGs - **"OFF"** (As required) (P,CP,E,N,LM)	2. NVGs - **"OFF"** (As required) (P,CP,E,N,LM)
4. Interior Lights - **"SET"** (P,CP,E,N,LM) **NOTE:** If NVG operations are to be subsequently resumed or if performing a tactical recovery from a low-level route, cockpit lighting may remain set at NVG lighting levels as long as flight instruments are sufficiently visible.	3. Interior Lights - **"SET"** (P,CP,E,N,LM)
5. Exterior Lights - **"SET"** (E)	
6. Altimeters - **"SET (State Setting)"** (CP,P,N)	
7. Radar Altimeter - **"SET (State Setting)"** (P,N)	
8. GCAS/GPWS (If Installed) - **"SET"** (As Required) (P/CP)	
9. Survival Equipment - **"STOWED"** (As required) (P,CP,N,E,LM)	4. Survival Equipment - **"STOWED"** (As required) (LM)
10. Necessary Equipment - **"SET"** (P,CP,E,N).	5. Lookouts - Cleared to Deposition
11. Bleed Air Valves/Regulators (As required) (E)	
12. Pressurization - (As required) (E)	
13. Fuel Panel - (As required) (E)	
14. Synchrophase Master - SET (As required) (E)	
15. IFF - **"SET"** (As required) (CP)	
16. Defensive Systems - **"SAFE/OFF"** (N)	
17. EMI Filter/Safety Pins (Some airplanes) - **"INSTALLED"** (LM)	6. EMI Filter/Safety Pins (Some airplanes) - **"INSTALLED"** (LM)
18. Combat Exit Checklist **"COMPLETE"** (LM,E)	7. Combat Exit Checklist - **"COMPLETE"** (LM,E)

Table 17.3. Combat Offload Checklist.

COCKPIT CREW	LOADMASTER
1. **"CREW, COMBAT OFFLOAD PREPARATION CHECKLIST"** (P)	
2. **"ACKNOWLEDGED"** (CP,E,N,LM)	1. **"ACKNOWLEDGED"** (CP,E,N,LM) ***NOTE:*** Sufficient tiedowns will be positioned forward of the load to provide one "G" aft restraint for pallets to be offloaded. If offload is aborted and left hand locks cannot be re-engaged, apply one "G" aft restraint from available floor or wall tiedown rings to the load or pallet before preceding aft.
3. Crew Briefing - **"COMPLETE"** (P)	2. Extraction Systems - Derigged/secured to load. ***NOTE:*** This step may be accomplished in-flight, conditions permitting. 2.1. Extraction chute removed, extraction line and bag secured on the load. 2.2. EFTC actuator arm stowed, pin installed. 2.3. Emergency restraint chains removed, stowed forward of forward most platform. 2.4. Static lines removed and secured to load (as required).
	3. Cargo Compartment Vertical Restraint Flanges - Retracted and Pinned Out
4. Hot Mic - **"ON"** (P,CP,E,N)	4. ADS Arms - Connected/Disconnected (As required) ***NOTE:*** When using method "A", ADS arms will be connected. ***NOTE:*** When using method "B", ADS arms will be disconnected.
5. Interphone, PA System - **"CHECKED"** (P,CP,E,N,LM) 5.1. Interphone and PA System Switch placed to the Interphone & PA position. (P) 5.2. Power - ON (N) 5.3. Speaker Selector - ALL (N) 5.4. Hot Mic - ON (P,CP,N,E) ***WARNING:*** A safety observer will take position at the bottom of the flight deck ladder to monitor all personnel and cargo movement and transmit, over interphone, a verbal warning to any personnel. ***CAUTION:*** Hot mic communications are not transmitted over the PA system. If emergency communications with the cargo compartment is required, the interphone switch must be depressed.	5. Interphone, PA System - **"CHECKED"** (P,CP,E,N,LM)
6. Ramp and Door - **"CLEAR TO OPEN"** (P), **"OPENED"** (LM)	6. Ramp and Door - **"CLEAR TO OPEN"** (P), **"OPENED"** (LM) ***NOTE:*** Cargo door and ramp will be opened to the ADS position after receiving clearance from the pilot.
7. Offload Preparation Checklist - **"COMPLETE"** (LM,E)	7. Offload Preparation Checklist - **"COMPLETE"** (LM,E)

Table 17.4. Combat Offload Checklist-METHOD A.

COCKPIT CREW	LOADMASTER
1. **"CREW, METHOD A OFFLOAD CHECKLIST"** (P)	
2. **"ACKNOWLEDGED"** (CP,E,N,LM)	1. **"ACKNOWLEDGED"** (CP,E,N,LM)
3. Brakes - **"SET"** (P)	2. Area Aft of Aircraft - Clear. 2.1. Ensure area is clear of personnel and equipment. 2.2. Post guards if available. **NOTE:** If CDS is to be offloaded, remove release gates, as required, and skip steps 3 through 7, 9, and 11, 13, and 14. **NOTE:** If no ramp pallet is aboard ensure ramp flanges and locks are retracted and proceed to step 8.
	3. Right hand ramp lock and flanges - Released/ Retracted. Stow handle and insert stowage pin. **CAUTION:** Ensure the ramp release handle are pulled to the full extent of their travel. Failure to do so will cause the pallet to become jammed on restraint flanges that do not retract.
4. Taxi Clearance - **"CLEAR TO TAXI"** (LM)	4. Taxi Clearance - **"CLEAR TO TAXI"** (LM) **NOTE:** Loadmaster will not make this checklist response until ready for offload.
5. Power - **"SET"** (P). Initiate this challenge after receiving taxi clearance from the loadmaster. **NOTE:** Advance power to approximately 5,000 inch/lbs of torque. This setting will vary depending upon surface weight, slope, wind, aircraft weight, and cargo weight.	
6. Brakes - **"RELEASED"** (P) **CAUTION:** Taxi the aircraft in a straight line. Any attempt to turn the aircraft during offload may damage the aircraft.	5. Left Hand Ramp Locks and Flanges - Released and Retracted. **CAUTION:** Ensure the ramp release handle are pulled to the full extent of their travel. Failure to do so will cause the pallet to become jammed on restraint flanges that do not retract. **NOTE:** Release left hand ramp locks and flanges when the pilot releases the brakes and the aircraft starts to accelerate.
7. **"LOAD CLEAR"** (LM)	6. **"LOAD CLEAR"** (LM)

COCKPIT CREW	LOADMASTER
8. Brakes - (as required) (P) Pilot may either continue taxiing or stop the aircraft if required due to ramp space or subsequent offloads. **WARNING:** Do not stop aircraft until loadmaster reports "LOAD CLEAR". **NOTE:** Repeat steps 3-6 for remaining pallets/platforms/CDS. **NOTE:** If space is limited and the offload environment permits, normal aircraft backing procedures may be used to provide maximum offload space.	7. Left Hand Ramp Lock Handle - Stowed, pin installed. **WARNING:** Do not proceed with step 8 until ensuring area behind and beside the cargo is clear of personnel and obstructions. **NOTE:** If only ramp pallet is to be offloaded, proceed to step 15.
	8. Loadmaster in position at FS 245. **WARNING:** Do not remove right hand dual rail forward restraint.
	9. Left Hand Locks - Released (As required) **WARNING:** If all pallets on the cargo floor are to be offloaded, place left hand simul handle in the aft restraint release position. For less than a complete offload, use sequential control handle to unlock only those locks for pallets to be offloaded. Pallets not intended to be offloaded will be restrained for one "G" aft restraint from available floor or wall tiedown rings to the load.
	10. Taxi Clearance - **"CLEAR TO TAXI"** (LM) **NOTE:** Loadmaster will not respond to this checklist response until ready for offload.
	11. Right Hand Master Control Handle - EMERGENCY Position. **NOTE:** Loadmaster will place the right hand master control handle to the EMERGENCY position when the pilot releases the brakes and the aircraft starts to accelerate.
	12. **"LOAD CLEAR"** (LM)
	13. Right Hand Master Control Handle - CHECK, then NORMAL position. **WARNING:** Before proceeding aft of any remaining pallets, visually inspect each left hand dual rail lock to ensure positive aft restraint.
	14. Left Hand Dual Rail Locks - Engaged and Checked
9. Interphone, PA Switch - **"INTERPHONE"** (P)	15. Ramp and Door - Closed and Locked
10. Combat Offload Checklist - **"COMPLETE"** (LM,E)	16. Combat Offload Checklist - **"COMPLETE"** (LM,E)

Table 17.5. Combat Offload Checklist—METHOD B.

COCKPIT CREW	LOADMASTER
***WARNING:* Do not use method "B" for airdrop rigged platforms.**	
1. **"CREW, METHOD B COMBAT OFFLOAD CHECKLIST"** (P) **NOTE:** Allow sufficient forward space to permit uninterrupted offload.	
2. **"ACKNOWLEDGED"** (CP,E,N,LM)	1. **"ACKNOWLEDGED"** (CP,E,N,LM)
	2. ADS Arms - Disconnected (As required)
	3. Ramp - Lowered. Lower ramp to approximately 12 inches above horizontal.
	4. Drums - In Place. (Direct placement of two upright 55-gallon steel drums aft of and on each side of the aircraft centerline.)
	5. Ramp - Repositioned (Adjust ramp height to be slightly above the drums.)
3. Brakes - **"SET"** (P)	6. Drift Straps - Installed (Attach to pallet to be offloaded)
	7. Area Aft of Aircraft - Clear 7.1. Ensure area is clear of personnel and equipment. 7.2. Post guards if available. **WARNING:** Loadmaster must return to FS 245 through the aircraft.
	8. Right Hand Master Control Handle - EMERGENCY Position **WARNING:** The maximum weight for pallets to be offloaded across the ramp at any one time when using method "B" is 15,000 pounds for C-130 E/H aircraft.
	9. Left Locks - Unlocked (As Required) **WARNING:** Sequentially unlock left hand locks for only the affected married pallets to be offloaded. Visually check left hand dual rail locks, ensuring positive engagement into remaining pallet indents.
	10. Pallets - Repositioned (Slowly push the load aft until the rear end of the aft most pallet is over the drums. Use the drift straps to control pallet movement.)
	11. Ramp - Readjusted/Positioned (Ramp lowered to allow load weight to rest on the drums.)
	12. Pallet - Secured (Chain pallet to a vehicle or suitable anchor positioned 10 to 15 feet behind the aircraft ramp. Remove load drift straps.) **CAUTION:** Do not use an extremely high vehicle under the tail of the aircraft as an anchor. As power is applied to taxi, the tail of the aircraft has a tendency to lower and may contact a high vehicle.

COCKPIT CREW	LOADMASTER
4. Taxi Clearance - **"CLEAR TO TAXI"** (LM)	13. Taxi Clearance - **"CLEAR TO TAXI"** (LM). Direct pilot to slowly taxi forward until approximately one foot of the aft portion of the pallet remains on the ramp.
5. Brakes - **"RELEASED"** (P). Taxi very slowly forward until notified to stop by the loadmaster. (Initiate this action after the loadmaster reports clear to taxi.)	
6. **"STOP TAXI"** (LM)	14. **"STOP TAXI"** (LM)
	15. Ramp - Readjusted (Adjust ramp height to slightly higher than drums)
	16. Drums - In Place (Direct placement of two upright 55-gallon steel drums under the load and directly in front of the previously positioned drums.
7. Brakes - **"SET"** (P) (Stop the airplane and initiate this challenge after the loadmaster reports STOP.) Repeat steps 4-7 until offload is complete.	17. Ramp - Lowered (Lower ramp until pallets are supported solely by the drums.) **NOTE:** Repeat steps 13 through 17 until married pallets are offloaded and clear of the aircraft
8. **"LOAD CLEAR"** (LM) **NOTE:** If additional married pallets are to be offloaded, repeat procedures beginning with step 3, or method "A" for single pallets. If method "A" is to be performed, consider moving the offload site away from any married pallets resting on 55-gallon drums.	18. **"LOAD CLEAR"** (LM) **NOTE:** If additional married pallets are to be offloaded, return to step 2, or Method A , (if applicable)
9. Interphone, PA Switch - **"INTERPHONE"** (P)	
10. Interphone panel - **"SET"** (P,CP,E,N)	19. Ramp and Door - Closed and Locked
	20. ADS Arms - Connected
11. Combat Offload Checklist - **"COMPLETE"** (LM,E)	21. Combat Offload Checklist - **"COMPLETE"** (LM,E)

Chapter 18

AIRCRAFT FORMATION

Section 18A—General Procedures

18.1. General. This chapter describes basic formation procedures. Consider safety, aircrew capability, proficiency, survivability and user needs when planning any formation tactic.

WARNING: Vortices generated during departure, airdrop, and recovery are significant in size, duration, and velocity. Due to the potential hazards, aircrews must be aware of their existence and attempt to avoid them.

18.2. Specified Times. The mission commander determines the sequence of events and mission times based on staff input, fuel requirements, parachutist/passenger comfort, taxi distances, briefing requirements, etc.

18.3. Weather Minimums.

18.3.1. Formation takeoff and landing minimums are the minimums for the airport navigation aid used, but not lower than 200 feet and one-mile visibility (RVR 50). During IFR formation operations, adhere to both ceiling and visibility minimums. If departure ceiling or visibility is below published landing minimums, but above 200 feet and one-mile visibility (RVR 50), the formation may take off if the requirements for a departure alternate as prescribed in **Chapter 6**, are met. If the runway has dual RVR readouts (approach and departure end of the runway) both ends must be at least RVR 50.

18.3.2. Peacetime drops of actual personnel or equipment for unilateral training will not be made if conditions over the DZ are less than 300 feet ceilings and one-half mile visibility. During joint operations, weather minimums are at the discretion of the using agency.

18.4. Ground Operations.

18.4.1. Minimum taxi interval is one aircraft length with four engines operating and two aircraft lengths with two engines operating. Formation lead may increase taxi intervals if circumstances dictate.

18.4.2. Accomplish a SKE flight command indicator (FCI) check prior to takeoff.

18.4.3. If aircraft are positioned on the runway, lead positions on the left side of the runway. Subsequent aircraft alternate sides with nose to tail clearance. If the feed-on method is used, subsequent aircraft move into position as the preceding aircraft start the takeoff roll.

18.5. Takeoff.

18.5.1. The minimum takeoff interval between aircraft is 15-seconds.

18.5.2. For aborts during takeoff, the navigator immediately transmits an abort call (three times using formation position number) on interplane and the copilot on primary frequency. Clear the runway as quickly as safety allows. Succeeding aircraft not on takeoff roll will hold until the runway is clear.

NOTE: For aircraft without "hot mike" capability on primary radio, the navigator transmits the abort call on primary, and the copilot (or navigator if the copilot is occupied with emergency procedures) transmits on interplane.

NOTE: Consider not using Have Quick or secure radio for interplane during takeoff.

18.5.3. To prevent damage to succeeding aircraft, do not advance power above flight idle until takeoff roll is started. Use a judicious and smooth application of power to achieve takeoff torque.

18.6. Altimeter Setting. Formation leaders will ensure all aircraft use the same altimeter setting.

18.7. Bank Angle, Airspeed and Ascent/Descent Rates. Formation leaders fly the appropriate airspeeds depicted in **Figure 18.1.** (or as briefed). Cruise altitudes and rates above 15,000 feet MSL must be planned commensurate with aircraft capability. Element leads are limited to 20 degrees of bank for AWADS/SKE operations. Ascent and descent rates depicted in this figure should be the maximum used by formation leaders.

18.8. Radio Discipline. Limit transmissions to those required for safety or control of the formation. HAVE QUICK and secure radios will be used when available.

18.9. Airborne Aborts.

18.9.1. Departure. Aircraft aborting during assembly will execute the prebriefed emergency procedures and hold clear of departing traffic unless an immediate landing is necessary. Remain in VMC if possible, notify lead, and contact the appropriate controlling agency.

18.9.2. Enroute. Aircraft aborting after assembly will notify lead. When directed, turn away from the formation in a safe direction based on terrain, ATC restrictions, etc. Aircraft within an element normally reposition to maintain a one-two relationship. Element lead will maintain position and announce intentions prior to leaving the formation. Lead may direct the aborting aircraft to rejoin at the end, or contact ATC and proceed to the recovery base.

18.9.3. Element Lead Aborts. If the element lead aborts the number two will normally assume the lead. After the new lead is established in position the number three aircraft will normally move to the number two position. Accomplish an FCI check. The new element lead is now responsible for relay of FCI/SKE commands from the preceding element lead. Refer to 3.2.3. of this AFI to ensure formation lead/position requirements are met.

18.10. Not Used.

18.11. No-Drop Decisions. When a situation requiring a formation no-drop arises, lead will notify the formation by using the FCI. If radio silence is not required by the tactical situation or non-SKE equipped aircraft are part of the formation, lead will transmit the no-drop over interplane frequency, and all aircraft will acknowledge. Do not transmit individual no-drops outside the individual aircraft.

Figure 18.1. Airspeed and Ascent / Descent Rates.

	Below 10,000 feet	10,000 to 15,000 feet	Above 15,000 feet
Climb	180 KIAS, 1,500 FPM	170 KIAS, 1,200 FPM	160 KIAS, 1,000 FPM
Assembly	180 KIAS	170 KIAS	160 KIAS
Cruise	Normally 210 KIAS	Normally 210 KIAS	Normally 190 KIAS
Enroute Altitude Change	Enroute Airspeed or As Briefed 1,000 FPM or As Briefed		
Descending Slowdown	140 KIAS, 1,000 FPM	As Briefed	As Briefed
DZ Escape	140 KIAS, 1,000 FPM	As Briefed	As Briefed

NOTE: Maximum cruise airspeed will depend on aircraft capability, mission requirements, and wingman consideration.

NOTE: There is an approximate five to ten knot (average eight) airspeed difference between aircraft with the standard pitot system and the Rosemount system. For formations consisting of aircraft with both systems the mission commanders will brief potential problem areas and proper corrective actions during the formation briefing. Differences in indicated airspeed from the slowdown through escape especially with heavyweight aircraft (increased stall speeds) present the greatest hazard and require proper crew awareness during this phase of flight.

Section 18B—Visual Procedures

18.12. General. Visual formation geometry will be based upon the threat environment, terrain, mission requirements, and other factors. Choose the geometry from paragraph **18.26.** through **18.32.** that gives the best tactical advantage for each segment of the route, changing as required during the mission. Flight leadership is critical to the success of these tactics. If SKE is briefed (for backup purposes), inform lead of any SKE malfunctions that occur during the mission.

18.13. Departure and Assembly. After crossing the field boundary, wingmen adhere to ATC requirements and assume enroute position. Maintain assembly airspeed until the briefed or announced acceleration point.

18.14. Acceleration. Lead accelerates to enroute airspeed and climbs or descends to departure altitude at the expiration of pre-briefed time. Other methods may be used (e.g., acceleration at a geographical point, DME, radio aid, etc.).

18.15. Late Takeoff. Aircraft departing late will contact lead and rejoin as directed or proceed single ship. The rejoining aircraft will establish a minimum of 500 feet altitude separation until the formation is in sight and clearance to rejoin is granted.

18.16. Enroute Procedures.

18.16.1. Altitude:

18.16.1.1. Day VFR Low-Level. Element leads maintain altitude by visual reference to the terrain, backed-up by the radar altimeter (if available). Wingmen maintain position relative to element lead while referencing the radar altimeter and terrain.

18.16.1.2. Night VFR Low-Level. Element leads maintain altitude by reference to the pressure altimeter. Wingmen maintain position relative to element lead and also monitor pressure altitude. If possible, accomplish an altimeter check comparing the radar altimeter to the expected altitude at well-defined checkpoints; this procedure should be accomplished periodically throughout the route.

18.16.2. Airspeed Changes. Lead announces airspeed changes of 15-knots or greater at night.

18.16.3. Aircraft Interval. Formation lead will select the formation interval based on threats, support aircraft, and other environmental factors.

18.16.4. Inadvertent Weather Penetration.

WARNING: It may be necessary to modify these procedures due to formation geometry, terrain, wingman considerations, and airspace restrictions etc. Inadvertent weather penetration in mountainous terrain using these procedures may be extremely hazardous. Mission planners will devise and brief procedures that best fit the situations.

NOTE: The following procedures are for emergency use and do not constitute authority to violate AFI 11-202V3, or Federal Aviation Regulations (FAR). Exercising these procedures under actual weather conditions is a violation subject to appropriate action by the AF and FAA. Individual aircraft should remain VFR if there is sufficient warning to take evasive action. Flight leads will take all practical measures to avoid entering controlled airspace without clearance.

18.16.4.1. Inadvertent weather penetration with SKE. Immediately upon penetrating the weather, on the command of lead, the formation climbs to a base altitude at or above the ESA. Lead will direct the flight to execute weather penetration with SKE, giving base heading and base altitude as a minimum. Element wingmen initiate climb, select SKE, set cross-track to 1,000 feet left or right as appropriate, and climb to the base altitude on the base heading at cruise airspeed and 1,000 fpm while maintaining SKE separation. When level at the base altitude, the leader commands the section to assume IFR interval. At this command, number 2 and 3 aircraft of each element reduce airspeed 15-knots and drift back until they establish intervals of 4,000 and 8,000-feet, respectively, then reset the appropriate cross-track distance. If visual conditions can not be reestablished, lead will contact the appropriate ATC facility for clearance.

18.16.4.2. Inadvertent weather penetration without SKE (see **Figure 18.4.**). Immediately upon penetrating the weather, on the command of the flight lead, the formation climbs to a base altitude at or above the ESA. Lead will direct the flight to execute weather penetration without SKE, giving base heading, altitude, and airspeed as a minimum. Climb at cruise speed and 1,000 feet per minute. When wingmen have a rate of climb of 1000 feet per minute established, number 2 and 3 wingmen turn 45 degrees right or left, respectively, from the base heading. Maintain this divergent course for two minutes before resuming base heading. The last element of the formation will occupy the base altitude; preceding elements will stack at 500-foot intervals, with the first element occupying the highest altitude. Do not change the base heading while in IMC. The formation leader will contact ATC for individual clearances.

NOTE: Lead may level the formation below the ESA for the route provided sustained VMC is encountered and terrain clearance is assured.

18.16.5. Rejoins. Aircraft joining a formation enroute will contact lead and rejoin as briefed. Remain at least 500-feet above or below the formation until the formation is in sight and clearance to rejoin is granted.

18.16.6. Before each turn-point, the navigator will brief the course and altitude for the following leg.

18.17. Slowdown Procedures.

18.17.1. Slowdown at a pre-briefed, identifiable point. Aircraft within an element will slowdown so as to maintain spacing. Succeeding element leaders will slow at the same reference point as formation lead.

18.17.2. Unless tactically unsound, night slowdowns will include an aural or visual signal.

18.17.3. Execute the slowdown maneuver by retarding all throttles to 1,000-inch pounds torque. As airspeed permits lower the flaps to 50-percent and slow to 140 KIAS. Depending on tactical situation/ terrain aircraft may perform either a level or ascending slowdown. Upon reaching drop altitude decelerate (if required) to drop airspeed.

18.18. Airdrop Procedures.

18.18.1. Each element lead flies an independent approach from completion of the slowdown maneuver until the end of the usable DZ or red light.

18.18.2. Wingmen maintain formation position but release based on individual CARP.

WARNING: Dropping at a lower altitude may cause loads or personnel from the preceding aircraft to impact the lower aircraft, causing damage or fatalities. In a crosswind condition (greater than 3 degrees of drift), wingmen will adjust their lateral formation position to maintain the same ground track as the element lead over the DZ, this will avoid wake turbulence from the preceding aircraft (**Figure 18.6.**).

***WARNING*:** Wake turbulence may be encountered after slowdown.

18.18.3. Minimum spacing for CDS airdrops is 6,000 feet between aircraft.

WARNING: Attempting to regain position by only reducing power or airspeed places the aircraft in a nose high, low-power situation and may lead to a stall.

18.18.4. Contacting wing-tip vortices and wake turbulence may create a change in relative wind and induce a stall with little or no warning. A likely situation where these phenomenon may occur is created during formation overruns. When this occurs, pilots should immediately turn away from the preceding aircraft and, when clear, reduce airspeed to regain formation position. Attempting to fall back by reducing power and airspeed only, places the aircraft in a nose-high, low-speed, low-power, situation that can quickly lead to a stall.

18.19. DZ Escape. At individual aircraft red light, accelerate to 140 KIAS and climb or descend as required. Element leaders will accelerate (900 TIT) at the pre-briefed location or time. Combat escape procedures will be pre-briefed.

CAUTION: Do not begin the departure maneuver until the loadmaster reports "load clear" or condition.

18.19.1. Aircraft experiencing difficulty retrieving static lines, closing doors or air deflectors will notify lead. The formation will not exceed 140 KIAS until the problem has been corrected. Lead may delay formation acceleration to allow the aircraft time to correct the problem. If static lines cannot be retrieved or air deflectors cannot be retracted, the effected aircraft should leave the formation following enroute abort procedures.

18.20. Recovery. Lead determines the type of visual recovery based upon formation geometry, threat scenario, traffic pattern, traffic flow, etc. The following are two possible methods: The overhead and The downwind. Other recovery methods may be flown, if briefed. Attain traffic pattern altitude and airspeed before arriving at the recovery field.

18.20.1. Downwind Recovery.

18.20.1.1. Enter a downwind leg for the active landing runway, normally maintaining 200 KIAS and 1,000-feet above field elevation or traffic pattern altitude, whichever is higher. Formation wingmen fly the same track as the element leader and stack up slightly to avoid wake turbulence. Position the downwind to allow for a continuous turn to final.

18.20.1.2. Lead will break approximately ½-NM past the approach end of the runway with a 45-degree angle of bank. Retard power to flight idle after the bank is established. Succeeding aircraft break with sufficient spacing to provide a 20-second landing interval. Complete the before landing checklist as airspeed permits. Make a level turn until reaching 140 KIAS or final approach airspeed, whichever is higher, then descend at this airspeed while completing the turn. Slow to final approach speed when established on final. Roll out on final at no less than 300 feet and ¼-mile from the runway.

18.20.2. Overhead Recovery.

18.20.2.1. Establish the initial approach on the runway extended centerline and fly the entry at 1500 feet above field elevation or traffic patter altitude, whichever is higher, normally at 200 KIAS. Element wingmen fly the same track as the element leader and stack up slightly to avoid wake turbulence.

18.20.2.2. Break as the tactical situation permits (wingmen should break no earlier than lead's point) with approximately 45-degree angle of bank and retard the power to flight idle after the bank is established. Make a level turn to the downwind leg with power reapplied as necessary to maintain 150 KIAS. Follow the same altitude and downwind track as lead.

18.20.2.3. Initiate the turn to final to establish a 20 second landing interval and complete the before landing checklist. Initiating turn to final approx. 12-14 seconds apart will generally result in 20 sec spacing at landing (applies only if aircraft break over the same point). Roll out on final at no less than 300 feet and 1/4 mile from the runway. Aircraft will not descend below preceding aircraft during the recovery. Airspeed during the turn will be 140 KIAS or final approach speed, whichever is higher. Slow to final approach speed when established on final.

18.21. Landing. All aircraft land on centerline using 50% flaps. Place throttles in ground idle and use brakes and reverse as briefed. Continue to the end of the runway (or briefed turn off) and clear the runway as rapidly as safety permits. The desired landing interval is 20 seconds, minimum 15 seconds. Consider extending the interval for strong crosswinds, narrow runways, or other adverse conditions.

WARNING: Do not perform touch-and-go landings during formation recoveries.

18.22. Lead VFR Position Changes.

18.22.1. Leader will signal or command a lead change if it does not occur at pre-briefed point.

18.22.2. The aborting leader will maneuver in the safest direction to assume the new position.

18.23. Orbit Procedures For Rejoins.

18.23.1. At a pre-briefed point, aircraft descend to 1000 feet above the briefed orbit altitude. Aircraft must be VFR before the orbit point. Slow to and maintain 180 KIAS (or briefed airspeed) at the orbit point. When beginning the first turn outbound, descend to and maintain 500-feet above the orbit until preceding aircraft are in sight or until beginning the turn inbound. The formation orbits until all aircraft are joined.

Section 18C—Visual Geometries

18.24. General. The most survivable formation geometry will depend on the tactical situation. Transition from one geometry to another (or a combination) may be required as the terrain or threat changes. Optimum flexibility and maneuverability are best obtained with 2-ship elements. Although not required, SKE can assist in flying visual formations, threat permitting.

18.25. Mutual Support. Element lead is primarily responsible for clearing the flight's 12 o'clock. Lead's secondary priorities are the right and left quadrants toward the wingmen. Wingmen lookout priorities change depending on their position. The wingmen to the right of the lead is primarily responsible for the left quadrant toward and beyond the flight. The secondary responsibility (if flying 2-ship elements, this becomes primary) is the right quadrant away from the flight and tertiary responsibility is the right front quadrant. The wingmen to the left of lead is primarily responsible for the right quadrant toward and beyond the flight. The secondary responsibility (primary if flying 2-ship elements) is the left quadrant away from the flight and tertiary responsibility is the front quadrant. Wingmen, flying 3-ship elements, should strive to avoid being on the same side of the lead since this degrades visual coverage. Lead identifies clearing responsibilities, including the flight's 6 o'clock position, during the briefing.

18.26. Fluid Trail (Figure 18.2. and Figure 18.3.). This tactic provides element wingmen with maximum flexibility, maintains formation integrity, optimizes terrain masking, provides more freedom for evasive maneuvers, and breaks the symmetrical visual pattern of the "standard in-trail" formation. Wingmen may maneuver in a designated arc from the 3 o'clock to the 9 o'clock position with respect to lead. (Tactically, the 6 o'clock position should be avoided if possible.) Leaders should periodically perform clearing turns to clear for their wingmen. Spacing between aircraft will be pre-briefed.

18.27. Modified "V" Formation (Figure 18.2. and Figure 18.3.). This geometry shortens the overall length of a formation, improving fighter escort coverage, while retaining the advantages of a dispersed, flexible formation. It's normally flown as a 6-ship section, consisting of three 2-ship elements. Aircraft within each element maintain a 2,000 to 4,000 feet interval. Number two element flies approximately 9,000 feet behind and to the right of the lead element, and number three element flies approximately 18,000 feet behind and to the left of the lead. Element wingmen maintain a fixed position on element lead, but each follower element is free to maneuver on an arc behind the lead element. Although this tactic is normally used for wide lateral dispersion (almost 5 miles), the formation can rapidly transition to a modified fluid trail formation for narrow corridors.

18.28. Line Abreast Formation (Figure 18.2. and Figure 18.3.). This geometry is useful over areas that provide minimal terrain masking such as a desert area or a coastal penetration from over water, and in situations where aircraft are flying to laterally spaced initial points. It is also useful where a large valley or a line of communications must be crossed or the formation is dropping on a wide drop zone. Planning turn points at the entry and exit of the line abreast leg allows for easy transition to and from in-trail formation. Line abreast is ideally flown in single or multiple 2-ship elements. The wingman (or element leads) can fly abeam lead with 4,000 to 24,000 feet lateral spacing or drop back into a box geometry. One disadvantage of the line abreast is that it allows little flexibility during turns, especially turns into the wingman. Tactical turns may be an option, or have the wingman move toward the in-trail position approaching the turn point and assume the line abreast position after the turn. See AFTTP 3-1V3(S), *Air Force Tactics, Techniques, and Procedures*, for other turning methods.

18.29. Box Formation (Figure 18.2. and Figure 18.3.). This geometry combines the advantages of a line abreast formation while providing more in the way of mutual support. The box may be flown two ways:

18.29.1. When flown as two, two-ship elements line abreast, the element leads fly abeam each other with 4,000 to 24,000 feet lateral spacing, with wingmen 2,000 to 24,000 feet in trail of their respective leaders.

18.29.2. When flown as two, line abreast elements in trail, wingmen maintain spacing from their respective leaders as in paragraph **18.28.**. Second element lead maintains 2,000 to 24,000 feet spacing behind formation.

18.30. Inverted Vic. This geometry is designed to exploit a limited number of RVDs to enhance visual lookout for the formation. It is a variation of line abreast, with a three-ship element. The first two aircraft fly line abreast, with the third aircraft in trail. If there are a limited number of RVDs available for the operation, the third aircraft in each element should be fitted with an RVD to improve lookout for the flight. Spacing for the third aircraft may be variable, depending on the number or spacing of elements, terrain, and other tactical factors.

18.31. Extended Trail. Extended trail is a modification of fluid trail in which separation between individual aircraft is significantly increased. Reduced visibility and terrain may not permit followers to navigate with visual or electronic reference to lead; therefore, followers must rely upon their own navigation.

18.32. Visual In-Trail (Figure 18.2.). The visual in-trail formation is a tactic designed primarily for mass airborne assault operations to large drop zones. It is useful for massing a large number of aircraft over an objective or flying to a split-up point to minimize impact on airspace. Two and three ship element geometries may be flown VFR in-trail. All aircraft maintain the same altitude while element wingmen maintain a wingtip-to-wingtip lateral separation out of wake turbulence to the right and left of the leader, respectively. Spacing is approximately 2,000 feet between element aircraft and approximately 12,000 feet between element leaders. The primary method of maintaining separation is visual; however, SKE, radar, and air-to-air TACAN may be used.

18.33. Individual Ingress. This tactic degrades the ground threat by varying the flight track each aircraft or element flies within a formation. It is particularly useful in avoiding detection, confusing or saturating enemy C2, and delaying enemy identification of mission objectives. Each aircraft or element either flies a separate route to a rendezvous point for possible rejoin and a common run across the DZ or to individual IPs for random DZ run-ins, or flies a common route to a break-up point for individual random run-ins.

Figure 18.2. Typical Visual Geometries.

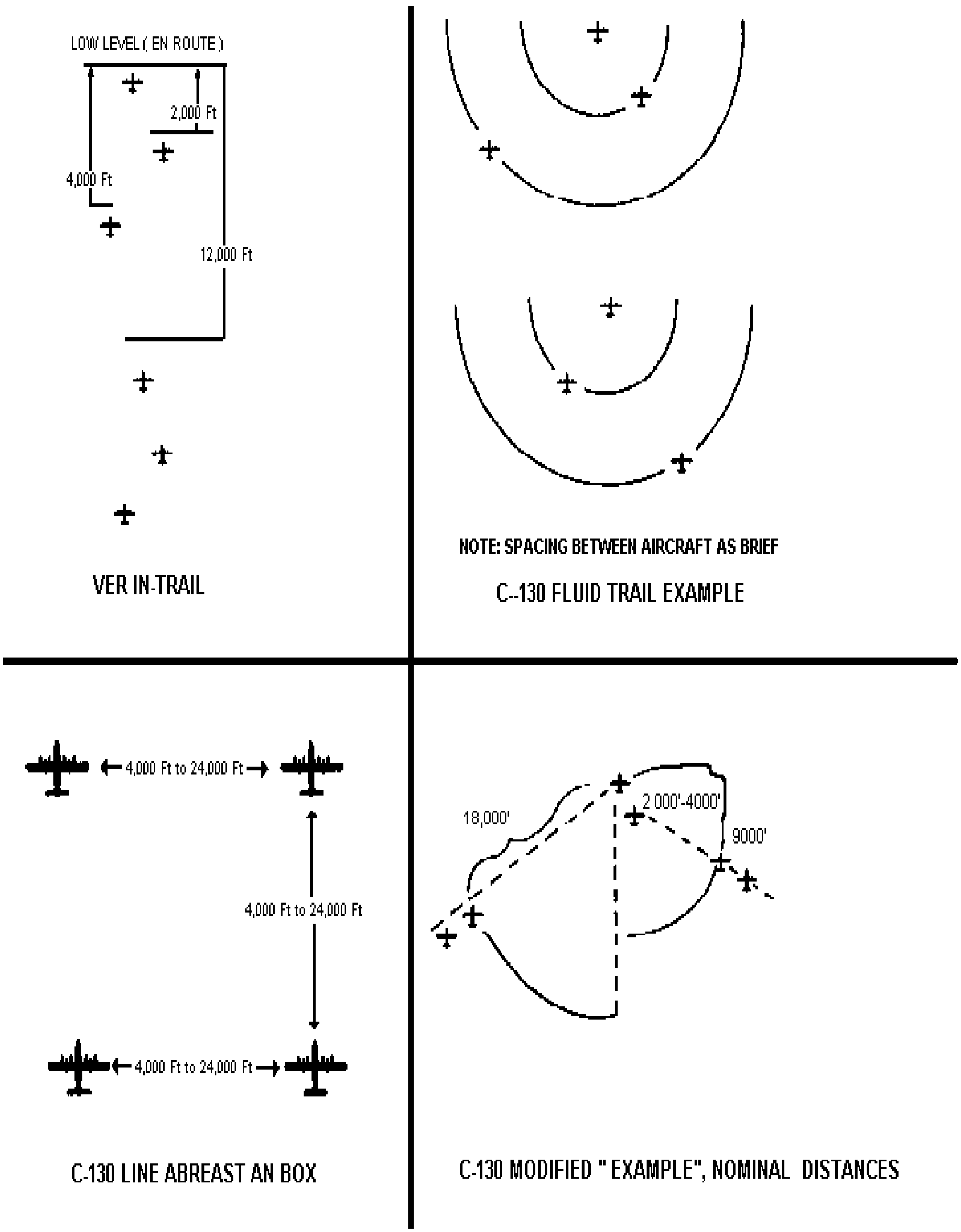


Figure 18.3. Visual Geometry Lookout Responsibilities.

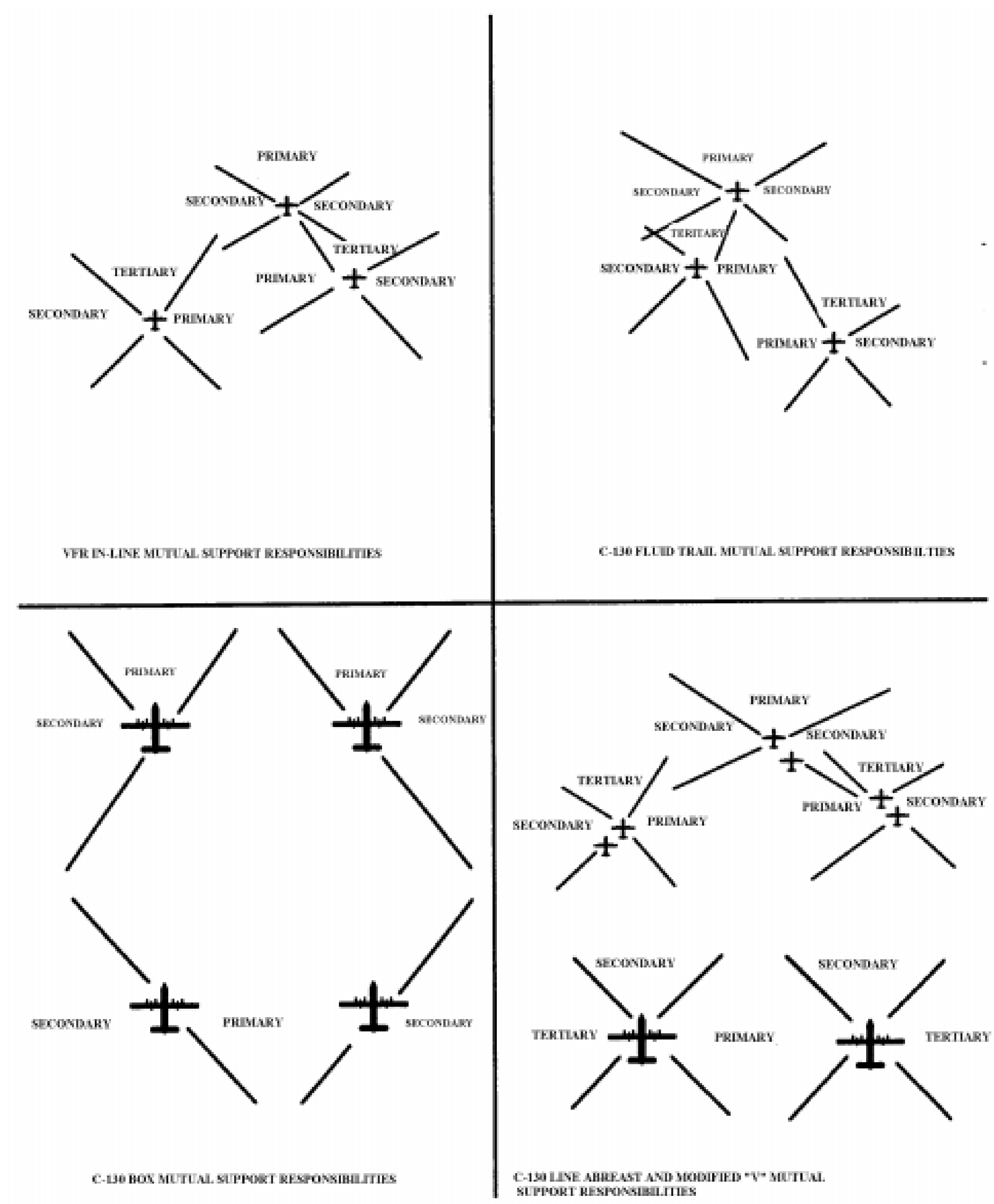
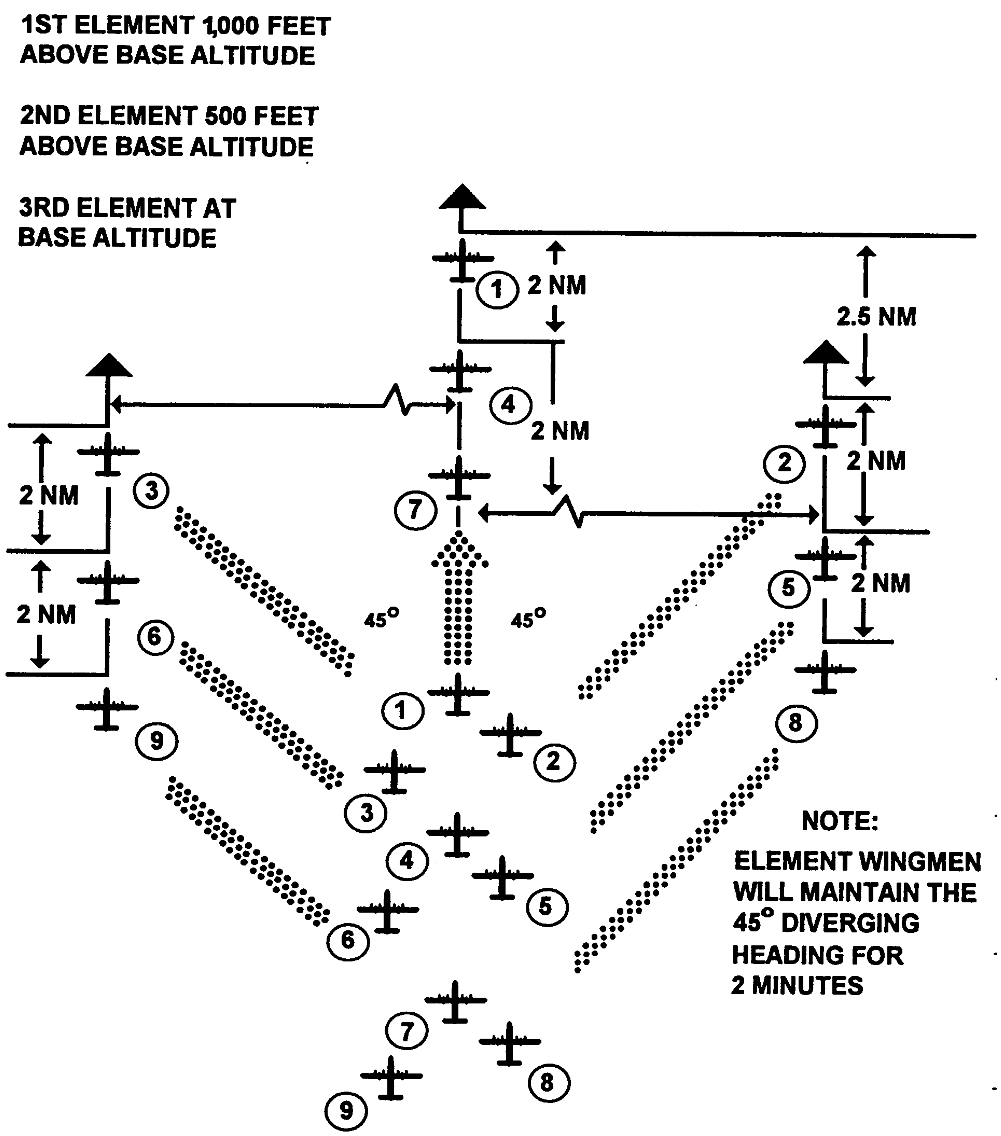


Figure 18.4. Enroute Weather Penetration Without SKE.



Section 18D—C-130 SKE and Zone Marker (ZM) Operating Procedures

18.34. Operating Procedures.

18.34.1. When operating two or more formations on the same SKE frequency within 80 NMs, use slot enable and do not enable common slot numbers. Formations operating on the same frequency with common slots enabled could result in mutual SKE interference and false targets on the SKE scope.

18.34.2. Formation members enable all slot numbers to be used on the flight to include slot 01 for the ZM.

WARNING: The slot enable switch can inadvertently be switched from the “all" to the "slot enable" position. If slots of formation aircraft and ZM are not selected, loss of track while scan (TWS) and ZM will occur.

18.34.3. All formation aircraft must be within 10 NMs of the master aircraft for the SKE to synchronize and within 4 NMs of the selected leader for the TWS to function properly.

18.34.4. When changing masters the aborted master switches to "FOLLOWER" and the new master selects "MASTER." Prebrief or verbally coordinate this procedure.

18.34.5. Aircraft SKE frequency changes may be accomplished with no time delay. ZM frequency changes require a minimum of 90 seconds.

18.34.6. For ZM drops the master aircraft is normally the lead aircraft. This allows maximum range ZM reception without master changes. However, master placement may be dictated by other factors such as formation size, departure and arrival requirements, or equipment degradation. For departures, placing the master in the middle of large formations (five aircraft or more) will help ensure the best signal reception during this phase of flight.

NOTE: ZM reception is dependent on the master aircraft being within 20 NMs of ZM position and within line of sight of the transmitter.

18.35. Mission Forms. AF Form 4096, **Station Keeping Equipment (SKE/Zone Marker (ZM) Debrief/ Malfunction Report)**, will be completed by the navigator on each aircraft following all SKE missions and will be turned in to home station tactics office. SST members will also fill out this form for each SKE/ZM airdrop mission and turn in the form to maintenance or relay the information as soon as possible.

18.36. Not Used.

18.37. Use of Flight Command Indicator (FCI). Use the FCI to signal maneuvers after turn to departure heading. Send true airspeed, present true or magnetic heading, and new true or magnetic heading prior to each turn if time and conditions permits. Element leads immediately relay acceleration, deceleration, climb and descent FCI commands. When directed by ATC to immediately change altitude or heading, lead depresses the appropriate preparatory FCI signal and after a short pause depresses the "E" before beginning the commanded maneuver. When established in the maneuver, signal the new heading or altitude. Priority of signals are altitude, heading, and airspeed. Lead signals turns of 10 degrees or more and airspeed changes of 10 KIAS or more with the FCI. Element leads select preceding element lead as leader and relay commands.

18.38. Departure and Assembly.

18.38.1. Assembly altitude should be as low as possible. After positive identification of all preceding aircraft, wingmen climb at speeds up to 190 KIAS to close to enroute spacing. After reaching assembly altitude, wingmen may accelerate up to 210 KIAS to complete the rejoin.

18.38.2. Formation Lead will signal acceleration with the FCI “+” as aircraft attain position. Lead sets power to 900 degrees TIT or as briefed to attain enroute airspeed.

NOTE: Assembly altitude under IFR will be at or above the MEA or MOCA on published airways. On direct flights or where no MEA or MOCA is published, assembly altitude will be 1,000 feet (2,000 feet in mountainous terrain) above the highest obstacle within a radius of 5 NMs (10 NMs outside the U.S.) of the intended route. When under positive radar control, the controlling agency assigns the assembly altitude. Under all conditions, aircrews ensure assembly altitude provides terrain and obstacle clearance for the formation.

CAUTION: Due to the location of the SKE antenna, signal blanking and momentary loss of SKE displays may occur during turns, climbs, and descents. Turns greater than 90 degrees may compound the blanking and should not be planned.

18.39. Not Used.

18.40. Rejoins.

18.40.1. Set leader number as required to join at the end of the formation and enable all formation slot numbers.

18.40.2. Set "range X 1,000 feet" switch at maximum range.

18.40.3. Approach the formation from 1,000 feet above or below the formation altitude.

18.40.4. Establish radio contact with the formation. Confirm SKE frequency and appropriate leader's slot number.

18.40.5. When the formation appears on the PPI/DVST, check that the master lost indications have extinguished.

18.40.6. The rejoining aircraft will identify the appropriate element leader. Upon positive identification, lead completes an FCI check prior to the rejoin.

18.40.7. Join on position while maintaining 1,000 feet altitude separation. When stabilized in position and the last formation aircraft is positively identified, request rejoin clearance from lead and climb or descend to formation altitude.

18.40.8. The rejoining aircraft must be stabilized in position at formation altitude by the IP (IMC) or by one-minute prior to TOT (VMC) to accomplish the drop.

18.41. Enroute Procedures.

18.41.1. Any aircraft which cannot maintain formation position and must abort the formation will notify lead of the nature of the emergency and intentions. If the emergency does not permit maintaining position until an individual clearance is obtained, establish a safe heading away from the formation and contact ATC for an individual clearance.

18.41.1.1. In the event an element lead aborts, the second aircraft of that element normally assumes the element lead position. The third aircraft of that element normally assumes the number two position. Refer to paragraph **3.2.3.** to ensure formation lead requirements are met.

18.41.1.2. The appropriate follower aircraft select the new lead's slot number, positively identify the new leader on the PPI, reset cross-track and range as required, and request an FCI check (as time allows).

18.41.2. The navigator backs-up SKE positioning with radar when it is not required for navigation or weather avoidance. Formation aircraft detecting a gross position error will notify the offending aircraft. The subject aircraft will confirm or establish position immediately.

18.41.3. Use the pressure altimeter and GSI to monitor altitude during climb or descent. Set the SKE secondary control panel to "altitude 00." The formation lead announces the altitude passing each 2,000 feet (including departure and recovery). All aircraft report reaching assigned altitude in sequence to the formation leader. Formation lead will not report the formation level to ATC until all aircraft have reported level at the assigned altitude.

18.41.4. Enroute Turns. Plan turns for less than 90 degrees to avoid destabilizing the formation. Element leads are limited to 20 degrees of bank for AWADS/SKE operations.

18.41.4.1. Follower aircraft will use the turn computer as the primary means to delay their turn based on true airspeed and timing from element lead's execute ("E") signal. The navigator will compute back-up timing to use if the turn computer fails. Use the PPI/DVST/RDU to maintain relative position and monitor other formation aircraft.

18.41.5. Airspeed Changes. Unless announced by ESKE or radio call, unprogrammed airspeed changes will be in increments of 10 knots. Leads will use 900-degrees TIT to accelerate and 600 degrees TIT to decelerate.

18.42. Spacing.

18.42.1. The second and third aircraft of each element respectively maintain 4,000 and 8,000 feet spacing from their element lead. Maintain spacing with reference to the element lead to reduce telescoping effects. The offset distance for enroute navigation is 500 feet right for the number 2 aircraft and 500 feet left for the number 3 aircraft.

18.42.2. Element leads maintain 12,000 feet separation from the preceding element lead, and "00" cross-track separation.

NOTE: During long missions, mission commanders may extend enroute spacing and/or cross-track to reduce fatigue, as required.

18.43. Loss of SKE-Individual Aircraft. Notify lead in all cases.

18.43.1. VMC.

18.43.1.1. If only the DVST/PPI is inoperative aircraft may elect to maintain position with lead's concurrence. The route, drop , and recover may be flown.

18.43.1.2. If all SKE indications are lost, use sound judgment in selecting the safest course of action. The following are a few options available:

18.43.1.2.1. Break out of the formation in the safest direction, and rejoin VFR at the end of the formation.

18.43.1.2.2. Obtain a separate clearance and proceed single ship.

NOTE: Consider using air-to-air TACAN to maintain spacing.

18.43.2. IMC.

18.43.2.1. Loss of all SKE indications will require a breakout. Use the following procedure if an alternate plan was not briefed:

18.43.2.2. If the formation is in straight and level flight climb 500 feet, turn 30 degrees in the safest direction from the base heading for 30 seconds, and then return to base heading. If the formation is in a turn roll out and climb 500 feet. Lead will contact (or direct contact to) ATC for a separate clearance.

CAUTION: Performing the above maneuvers in a radar pattern may place an aircraft outside of protected airspace.

18.44. Overrun Procedures. When executing an overrun, establish safe separation between aircraft and reacquire formation position. Overly aggressive maneuvers by element leads adversely affect the following elements.

18.44.1. Element Lead. If cross-track is set, start a turn in the direction of the set cross-track unless safety dictates otherwise. Set an additional 1,300 feet cross-track and monitor position on the TWS and PPI/DVST/RDU. If crosstrack is zero, turn in the safest direction based on airspace restrictions, flight path, and terrain obstructions; set 1,300 feet crosstrack; and monitor position on the TWS and PPI/DVST/RDU. Element lead announces his overrun giving element number, base heading, and base airspeed. After the correct spacing has been attained, reestablish formation position. If not in position by one minute prior to TOT, abort the drop.

18.44.2. Wingman. Start a turn in the direction of the set cross-track, set an additional 300 feet crosstrack and monitor position. Aircraft will announce overrun by formation position. After the correct spacing has been attained, reestablish formation position. If not in a safe drop position by one minute prior to TOT, abort the drop.

18.45. Lead Change.

18.45.1. Unless briefed otherwise, the AC relinquishing the lead commands the lead change. The new leader acknowledges.

18.45.2. The relinquishing leader turns 45-degrees away from base heading in the safest direction until 1 NM from the formation, reset appropriate crosstrack, range, and leader number, and drifts back to rejoin at the end of the formation. If VMC, the old leader may join at a coordinated position within the formation.

18.45.3. The appropriate follower aircraft selects the new leader number and resets crosstrack and range as required to maintain a one-two relationship within elements.

18.45.4. New lead performs an FCI check.

18.46. Run-In and Slowdown.

NOTE: Do not attempt AWADS/SKE airdrops in areas of thunderstorm activity, heavy precipitation, or during icing conditions.

18.46.1. All aircraft will use lead's drift to determine SKE crosstrack.

NOTE: Element leaders will maintain position with reference to formation lead until reaching drop altitude at which time they fly an independent approach.

18.46.2. Slowdown. The entire formation slows down simultaneously. Lead signals 30 seconds prior to slowdown with the SKE "SD" button. Lead transmits a 5-second "-" prep. Lead initiates slowdown with the FCI "E" and a radio call (tactical situation permitting). After slowdown, element leads are limited to 10 degrees of bank.

18.46.2.1. Level Slowdown. Reduce power to 1,000 inch-pounds of torque and maintain drop altitude. As airspeed permits, extend flaps to 50 percent and complete the slowdown checklist.

18.46.2.2. Descending Slowdown. Reduce power to 1,000 inch-pounds of torque, maintain level flight, and as airspeed permits, extend flaps to 50 percent. Upon reaching 140 KIAS, the formation may descend to drop altitude. Formation and element leaders signal the descent using a 5-second down prep and “E”. Start descent using 140 KIAS and 1,000 feet per minute until reaching drop altitude. Slow to drop airspeed and complete the slowdown checklist. Do not initiate descent from the last enroute altitude until the following conditions are met:

18.46.2.2.1. Lead's position is positively known.

18.46.2.2.2. The entire formation is within 3 NMs of DZ run-in course centerline.

18.46.2.2.3. The last aircraft in the formation is at or past the DZ entry point.

WARNING: Analyze pre-drop gross weight to determine if obstructions can be cleared with one engine inoperative. If obstruction clearance cannot be met; reduce the number of aircraft, revise run-in course, or increase drop altitude.

18.46.2.3. Each element stacks 50-feet above the preceding element. Wingmen maintain the same drop altitude as their element leaders by reference to the pressure altimeter.

18.46.2.4. After level at drop altitude, lead rechecks drift information and passes revised drift to the formation, if different.

18.46.2.5. Echelon Turns After slowdown, element leaders are limited to 10 degrees of bank maximum.

18.46.2.6. Independent Run-Ins. Element leaders fly independent run-ins to their own CARP from the completion of the slowdown checklist or descent through the escape maneuver. All elements will use formation lead’s drift on their independent run-ins.

18.47. Drop Clearance. Lead normally confirms clearance to drop at least 2 minutes prior to TOT by radio, ZM, radar beacon, visual or electronic device, or other briefed signal. All aircraft monitor the DZ primary frequency in the event conditions on the DZ require a "no drop" after receiving initial clearance. Call formation no drops over interplane and signal "no drop" on the FCI (Use only the FCI signal if radio silence is mandatory).

18.48. Not Used.

18.49. Not Used.

18.50. Drop Execution.

18.50.1. At the navigator's "1-minute" and "5-second” calls, element lead signals the element with the FCI downprep. At the "green light" call, the pilot depresses the FCI "E". Lead's airdrop computer must remain in the airdrop mode until element wingmen have completed their drops.

18.50.2. AWADS or ZM equipped element wingmen will maintain formation position via TWS and use AWADS/ZM timing (primary) or SKE timing (secondary) for release. If element lead no-drops and the situation does not warrant an element no-drop, AWADS/ZM equipped wingmen may continue the drop.

18.50.3. In IMC conditions, AWADS/ZM deputy lead flies normal SKE position while resolving an independent AWADS/ZM CARP. Not later than 2 minutes to drop, deputy lead navigator checks the computer crosstrack and notifies lead if the readout is 400 yards or greater and not correcting. Lead will verify the programmed drop information and radar presentation or cursor placement to make the drop or no-drop decision.

18.50.4. SKE-only equipped wingmen release on the basis of SKE timing. Use the actual in-track distance from lead at the time of lead's "E". Once timing has begun, follower aircraft must maintain constant airspeed for accurate timing.

18.51. DZ Escape. Element leader maintains drop heading, altitude, and airspeed for 1 minute (or as briefed) after "red light", before commencing the escape maneuver. Element lead signals 30 seconds and 5 seconds prior to escape with the FCI "+" prep and initiates escape with the FCI "E".

18.51.1. At escape, each element establishes 140 KIAS, 1,000 feet per minute rate of climb, and turns to DZ escape heading. Formation lead maintains 140 KIAS at assembly altitude until follower aircraft are in position. Formation lead then signals climb/acceleration with the FCI and continues the recovery route. Assembly altitude will comply with IFR altitude restrictions in FLIP, AFI 11-202 Vol 3, and the local IFR structure.

18.51.2. Aircraft having difficulty completing the completion of drop checklist must notify lead. The formation will not exceed 140 KIAS until the aircraft has corrected the problem or departed the formation.

18.51.3. Emergency Salvo. For an equipment drop malfunction, notify lead and attempt to secure the load. If the load requires jettison:

18.51.3.1. AWADS/ZM aircraft depart the formation and proceed to the salvo area. If the aircraft is a formation or element lead aircraft, perform a lead change.

18.51.3.2. Non-AWADS/ZM Wingmen. If VFR can be maintained, advise the formation leader that an emergency is required, exit the formation and proceed to the salvo area. If IMC, advise formation lead that a salvo is required. The entire formation will then proceed to the salvo area.

18.52. Recoveries. When performing formation recoveries, prior coordination with the ATC facility servicing the airfield is necessary for any specific mission requirements. If three or more aircraft must hold request extended holding. In planning an approach, consider factors such as holding or procedure turn requirements and airfield congestion in determining the size of each recovering section. In general, limit approaches to no more than nine aircraft. All aircraft fly formation approaches with 50 percent flaps and land on the runway centerline. The aircraft acting as master for the formation must not turn the SKE off until all other aircraft in the formation have landed.

NOTE: If recovering a large formation, and the planned approach is not a straight-in, obtain a minimum of 5 minutes separation between sections of nine or less aircraft prior to reaching the recovery base. The airspace must be available for each section of nine or less to hold upon arrival at the recovery base if immediate landing is not possible.

NOTE: Use of the SKE turn computer is not recommended for holding nor for procedure turn, TACAN arc, or radar approaches from a holding fix.

18.52.1. Low-Altitude Approaches. Limit this type of approach to formations of nine or less aircraft.

18.52.1.1. Holding pattern or procedure turn pattern entry will be within 70 degrees of the published inbound course on the non-maneuvering side or within 20 degrees on the maneuvering side and a minimum of 1000 feet above procedure turn or GCA pickup altitude. Lead may use a teardrop course. Do not enter from the quadrant requiring a turn to the non-maneuvering side. Reduce airspeed to 170 KIAS if holding is required. When holding is not required and within 3 minutes of the initial approach fix (IAF) or when in the holding pattern and cleared for the approach, reduce airspeed to 150 KIAS and configure for landing. Start the approach from over the IAF. Lead will transmit a drift-corrected heading to fly on the outbound leg and must navigate precisely to the holding or procedure turn fix, while followers maintain exact formation position.

18.52.1.2. Lead signals their turn outbound over the IAF with the FCI at station passage. All follower aircraft delay the turn outbound based on SKE timing to maintain formation interval, and complete the approach in accordance with AFI 11-217. Approach separation is obtained by delaying the turn inbound. The following times are based on a 4,000-foot interval. If the interval is other than 4,000 feet, adjust the timing accordingly. (One method is to add 2 seconds for each 1,000 feet long and subtract 2 seconds for each 1,000 feet close.) Element leads signal with the FCI when beginning the turn to final. Number 2 maintains the outbound track for 18 seconds and number 3 for 36 seconds. Succeeding element leaders turn 54 seconds after the previous leader. Airspeed inbound to the FAF is 150 KIAS.

NOTE: Pilots flying the approach should have their ADI switch in normal when on final for SKE instrument approaches. This does not preclude completing the before-landing checklist prior to the final approach segment.

18.52.1.3. When over the FAF, lead signals an airspeed reduction to 140 KIAS or final approach speed, whichever is higher. (Radio call only if this speed is other than 140 KIAS and unable to transmit this speed using the FCI.) Maintain this speed until the missed approach point. Use the terminal navigational aid for course information on final approach and use the PPI/DVST for spacing. The interval between aircraft on final is 6,000 feet desired, 5,000 feet minimum.

NOTE: In those cases when an FAF is not depicted on the approach (i.e., NAVAID located on the airfield, the formation lead signals the airspeed reduction to 140 KIAS at their discretion on final). If possible, wait until the last aircraft has completed the procedure turn.

18.52.2. Straight-In Approaches. (No holding or procedure turn in accordance with AFI 11-217). Inbound to the recovery base, lead directs the formation to establish approach separation. On receiving this call; all follower aircraft reduce airspeed by 30 knots (to no lower than 150 KIAS), reset SKE in-track distance to 6,000 feet (or as briefed), and establish new separation. (Using this procedure, nine aircraft may be recovered in 12 minutes.) When cleared for the approach, all aircraft maintain the same relative track inbound to the final approach course, at which time each aircraft executes an independent approach. Airspeed inbound to the FAF will be 150 KIAS. When slowing to this speed, all aircraft configure for landing. See paragraph **18.53.3.** for FAF inbound procedures.

18.52.3. Missed Approach. Aircraft executing a missed approach flies the published or directed procedure and contacts the controlling agency for instructions. If the airfield is reported below minimums after the approach is started, the formation executes a missed approach, maintaining 150 KIAS and approach separation. Formation lead requests individual approaches, if available and weather permits. In a radar environment, give the controlling agency the order in which aircraft are to depart the flight. (Use caution, as loss of SKE may occur when the master departs the formation.) If individual approaches cannot be obtained or approach control is not available, the formation will proceed to alternate airfields.

18.52.4. TACAN Arc Approaches. Establish approach separation according to paragraph **18.53.2.** prior to arrival at the holding or initial approach fix.

18.52.4.1. Holding Required. Limit formation size to six aircraft. Reduce airspeed to 170 KIAS and enter holding as described in paragraph 18.52.1.1. When inbound in the holding pattern and cleared for the approach, reduce airspeed to 150 KIAS and configure for landing. Approaching the lead point for arc interception, lead will signal the turn with the FCI and intercept the arc. Follower aircraft delay this turn based on SKE spacing.

18.52.4.2. Holding Not Required. After approach separation is established and within 3 minutes of the IAF, reduce airspeed to 150 KIAS and configure for landing. Approaching the lead point for arc interception, lead signals the turn with the FCI and intercepts the arc. Follower aircraft delay this turn based on SKE spacing.

18.52.4.3. Each aircraft flies the arc independently maintaining approach separation. The primary consideration during this type of approach is precisely flying the arc while maintaining the desired separation. Lead signals with the FCI when turning to intercept the final approach course. Follower aircraft will delay this turn based on SKE spacing. Airspeed inbound to the FAF is 150 KIAS. See paragraph **18.52.1.3.** for FAF inbound procedures.

NOTE: Loss of SKE presentation may occur if the master is one of the first aircraft to begin the approach.

18.52.5. Radar Approach from a Holding fix. Normally, this type of approach requires holding at a prebriefed fix with ATC providing individual approach clearances. Holding is prescribed in paragraph **18.52.1.1.**. The following procedure must be coordinated with ATC/GCA:

18.52.5.1. ATC will clear each element for the approach. Aircraft should depart the holding fix at 2 minute intervals so GCA or approach control can provide standard aircraft separation.

18.52.5.1.1. Element Lead. When over the holding fix; complete a 360-degree turn on the holding side, descend 1,000 feet to the GCA pickup altitude, and depart the fix under approach or GCA control.

18.52.5.1.2. Number 2. When over the holding fix; complete a turn outbound and maintain the outbound course for 1-minute. At the expiration of this time; turn back inbound, descend 1,000 feet to the GCA pickup altitude, and depart the fix under approach or GCA control.

18.52.5.1.3. Number 3. When over the holding fix, complete a turn outbound and maintain the outbound course for 2-minutes. At the expiration of 2 minutes out-bound; turn back inbound, descend 1,000 feet to the GCA pickup altitude, and depart the fix under approach or GCA control.

18.52.5.1.4. Succeeding Elements. The second and third elements continue holding until cleared for the approach. Normally, ATC will clear the second element for the approach when inbound back to the holding fix. Succeeding elements execute the approach in the same manner as the first element. This procedure provides two-minute separation between aircraft and can recover nine aircraft in 16-minutes.

18.52.5.2. All aircraft maintain 170 KIAS until departing the folding fix under approach or GCA control. After departing the holding fix, reduce airspeed to 150 KIAS and complete the approach in accordance with AFI 11-217. Aircraft executing a missed approach will follow controlling agency instructions. Normally, ATC will not provide a subsequent approach until the remainder of the formation has recovered.

18.52.6. Airborne Station-Keeping Approach (ASA). ASA is a method of instrument recovery into an austere airfield. This procedure requires an AWADS aircraft to provide radar surveillance and final course alignment information to allow aircraft to land at 1-minute intervals and is limited to formations of nine or less aircraft. Position the master in the center of the formation. The master must remain in operation until all aircraft have landed. All aircraft except lead and the formation master must turn the SKE to standby after landing. Traffic pattern altitude for this approach is a minimum of 1,000 feet above the terrain or 2,000 feet in mountainous terrain. Do not use these procedures during IFR conditions unless approved by MAJCOM in accordance with AFI 11-202V 3.

18.52.6.1. Separation Procedures. Prior to reaching the terminal area, the formation will establish a 2 NM separation between aircraft. The enroute distance required to acquire 2 NM spacing for a nine-ship at 210 KIAS is approximately 60 NMs and the time required is 16 minutes. To achieve the separation, all aircraft reduce airspeed simultaneously (to no lower than 150 KIAS) on the command of lead. Lead maintains enroute airspeed; number 2 and 3 reduce airspeed by 15 knots until separation is attained. Second element aircraft reduce airspeed by 25 knots and third element aircraft reduce airspeed by 40 knots until spacing is attained. All aircraft set crosstrack at “00”.

18.52.6.2. Traffic Pattern. On command of lead, all aircraft descend to 1,000 feet above traffic pattern altitude. Ten NMs before reaching the initial approach radar fix, the formation slows to 170 KIAS. The formation must approach the airfield on a heading that allows a turn of 90-degrees or less to the crosswind leg. Each aircraft selects the preceding aircraft as the leader and maintains position 2 NMs in-trail with zero crosstrack.

18.52.6.2.1. On reaching the initial approach radar fix, lead turns to crosswind. Lead signals this turn and announces the crosswind heading to be flown. Lead maintains the crosswind heading for 1 minute and then turns to downwind. When on downwind; lead descends to traffic pattern altitude, slows to 150 KIAS, and configures for landing. The downwind leg will be a minimum of 3 minutes. Fly a single-ship ARA. After clearing the runway, lead taxis as quickly as safety permits to the approach end of the runway. Lead then positions 200 feet from the centerline, announces their position to the other aircraft and remains in this position until all have landed.

18.52.6.2.2. After receiving lead's initial turn signal, subsequent aircraft use timing to determine the turn to crosswind. Number 2 aircraft maintains this heading for 2 minutes before turning to downwind. Number 3 and subsequent aircraft start the downwind turn when the aircraft directly ahead of them is 80 degrees abeam their position with reference to the PPI/DVST. When established on the downwind; each aircraft descends to traffic pattern altitude, slows to 150 KIAS, and configures for landing. The number 2 aircraft maintains the downwind leg for a minimum of 4 minutes before turning base. Number 3 and subsequent aircraft start the turn to base when the preceding aircraft is 80 degrees abeam their position.

18.52.6.2.2.1. AWADS Aircraft. When established on base, perform an ARA. Maintain approach spacing by reference to the range meter and the pilot's DVST. When on final approach, each aircraft will select the formation lead's slot number as the leader number.

18.52.6.2.2.2. SKE Aircraft. Make the turn to final by reference to the preceding aircraft on the PPI/DVST. Lead the turn to final by approximately 10 degrees and attempt to roll out in a position on runway centerline with reference to formation lead. When established on final approach, select the formation lead's slot number as the leader number. Use the PPI/DVST to maintain final approach track until 3 miles from the runway, at which time TWS becomes reliable and can be used for course alignment. When reaching a position 24,000 feet (4 NMs) from the runway, start descent to MDA and advise ground-based aircraft.

WARNING: Do not initiate descent to MDA until terrain clearance is assured.

18.52.6.3. Missed Approach. If formation lead executes a missed approach, following aircraft also execute the missed approach and establish 2 NM separation. Lead communicates intent to re-execute the ASA or proceeds to the alternate. Follower aircraft executing a missed approach turn and climb to crosswind leg using the ground-based aircraft as reference. Another ASA or ARA may then be made.

18.52.7. High Altitude Terminal Recovery. A high altitude terminal recovery is a method of arriving at a terminal facility in formation, holding the formation in IMC, and using a single-ship penetration for descent and landing. The minimum separation between aircraft will be 3 minutes during the letdown and penetration. When required, the formation leader announces or briefs modifications to published letdown procedures, emphasizing newly established initial penetration altitude and penetration turn altitude. The master aircraft must not turn SKE off until all others have landed.

18.52.7.1. Prior to reaching the designated letdown fix, lead notifies approach control of the sequence in which the aircraft will approach for landing. Lead coordinates special maneuvering airspace with ATC prior to reaching the IAF. Lead will request permission to immediately letdown upon arrival over the letdown fix. For letdowns that require maintaining initial penetration altitude until a specified number of miles have been flown prior to beginning descent, lead notifies formation aircraft of the time each aircraft will fly to cover the prescribed distance. In addition, lead slows the formation to 170 KIAS prior to arriving over the fix. Lead (or ATC) will assign higher altitude of at least 1,000 feet to subsequent sections.

18.52.7.2. If cleared for an immediate approach (holding not required), the formation approaches the letdown fix on a track within 45-degrees of the reciprocal to the outbound penetration course at the assigned base altitude. If required, hold as prescribed in paragraph **18.52.1.1.**

18.52.7.3. All aircraft monitor approach control and interplane. Each aircraft contacts the applicable controlling agency when departing the fix on the outbound penetration course. If no controlling agency is available, make this call on interplane.

18.52.7.4. Over the fix:

18.52.7.4.1. Lead aircraft in the first element of the first section immediately turns to the outbound penetration approach course, descends 1,000 feet, and executes the published letdown procedure. Numbers 2 and 3 aircraft in the first element of the first section track outbound on the reciprocal to the outbound penetration approach course plus or minus 20 degrees as required. After 1 1/2 minutes of wings level flight, Number 2 turns inbound to the fix, immediately descends 1,000 feet, returns to the approach fix on the outbound approach course at 170 KIAS, and executes the published letdown procedures. After 3-minutes wings level flight; number 3 executes a turn inbound to the fix, immediately descends to 1,000 feet, returns to the approach fix on the outbound approach course at 170 KIAS, and executes the published letdown procedure.

18.52.7.4.2. Subsequent elements in the first section. Second element completes one 3-minute leg holding pattern. Third element completes two 3-minute leg holding patterns. Element leads turn inbound abeam the fix or when wings level outbound leg (whichever is later), descend 1,000 feet and execute the published letdown procedure. Number 2 proceeds outbound for 1 1/2 minutes and Number 3 for 3-minutes after passing abeam the fix or wings level outbound, whichever is later. Then turn to the fix and descend 1,000 feet.

18.52.7.4.3. Subsequent sections hold in 3-minute holding patterns over the letdown fix and execute the recovery at least 3 minutes after the last aircraft in the preceding section has reported departing the fix outbound on the approach.

CAUTION: Loss of SKE presentation may occur if the master is one of the first aircraft to begin the approach.

18.52.7.5. During penetration, aircraft will maintain 3,500 FPM rate of descent until reaching 230 KIAS; then maintain 230 KIAS until 1,000 feet above level-off altitude. Procedures from level-off to the airfield are in the flight manual and in AFM 11-217 for the type of approach being made.

18.52.8. International Civil Aviation Organization (ICAO) Approaches. There are no procedures for executing ICAO 45/180 and 80/260 procedure turn approaches, so these are flown single-ship only.

18.53. Rendezvous. These procedures are designed to join multiple sections together into one formation. Each section converges on a common, prebriefed point referred to as the start rendezvous point (SRP). Each section arrives at the SRP on a different SKE frequency, two minutes apart, with a minimum altitude separation of 1,000 feet from other sections. Rendezvous track must be at least 50 NMs long for two sections to join.

18.53.1. The first section decreases airspeed to 180 KIAS two minutes past the SRP. The last aircraft in the first section becomes the master for the rendezvous. The second section continues to fly enroute airspeed upon reaching the SRP and the same track as the first section.

18.53.2. Two minutes after passing the SRP (or as briefed), subsequent sections switch to the first section's SKE frequency. All subsequent section masters switch to “Follower”. When all SKE systems are resynchronized, subsequent section leads positively identify the last aircraft in the preceding section and continue to close to enroute spacing. The joining section slows to 1 80 KIAS as necessary to stabilize in position.

18.53.3. Once established in position and on formation lead's FCI signal, the joining section climbs or descends to formation enroute altitude.

18.53.4. Ensure that aircraft do not have duplicate slot numbers and that all aircraft enable slot numbers from the other sections. Join only one section to the formation at a time.

18.54. Multiple Points of Impact (MPI). MPIs are used to disperse airdropped loads laterally, as well as longitudinally, on the DZ.

18.54.1. Each element of the equipment serial has a different PI (spaced downtrack from each other). Wingmen use the PI offset charts (Annex A) in lieu of the SKE drift offset charts. PI charts place the ground track of the wingmen 200 yards left or right of the element leader.

18.54.2. Each element of the personnel serial drops on the same PI (normally on centerline, 200 yards short of the first heavy equipment PI). Wingmen use the MPI offset charts (annex A) in lieu of the SKE drift offset charts. Accomplish longitudinal separation by sequencing personnel elements in the same order in which their equipment was sequenced.

18.54.3. Each element computes a separate usable DZ time based on the location of their PI.

Section 18E—Combination AWADS/SKE and Visual Procedures

18.55. General. Transition between AWADS/SKE and visual procedures may be advantageous or necessary.

18.55.1. From visual formations, lead directs the formation to "assume IFR interval" on interplane. Number 2 and 3 in each element assume 4,000-and 8,000-foot spacing respectively, by decreasing airspeed 15 knots and drifting back.

18.55.2. From AWADS/SKE -formations, lead directs the formation to assume visual procedures on interplane (or as briefed). Follower aircraft then assume the briefed visual formation geometry.

Section 18F—Instrument Formation Procedures Excluding AWADS/SKE

18.56. General. Vertical IFR formation provides both vertical and longitudinal separation between aircraft. Vertical IFR formation procedures are designed for operations through IFR conditions, followed by a VFR rejoins. Radar is required for vertical IFR join-ups.

18.57. Separation. Specified longitudinal and vertical separation ensures an adequate margin of safety during IFR weather conditions. Longitudinal spacing between aircraft is 1.5 NMs. Use radar (primary) and air-to-air TACAN (secondary) to maintain separation. Element lead aircraft maintains 4.5 NMs separation on the preceding element lead. Vertical separation between section aircraft is 500 feet.

18.58. Weather Minimums. The formation will not be flown in areas of heavy precipitation, icing, or thunderstorms.

18.58.1. Departure Airfield - as determined by the COMALF, but no lower than those specified in paragraph **18.3.**.

18.58.1.1. Descent and orbit area:

18.58.1.2. 18 aircraft (3 sections): 2,500 feet and 5 miles.

18.58.1.3. More than 18 aircraft: 5,000 feet and 5 miles.

18.59. Takeoff and Assembly. The takeoff interval is 30 seconds between aircraft in a section, 4 minutes between section leads, and 30 minutes between serial leads. Aircraft maintain runway heading for 2 minutes after brake release, then turn to the departure heading using airspeeds and rates of IAW this instruction. Lead is limited to 900 degrees TIT and 1,000 FPM. Lead maintains assembly airspeed until the last aircraft calls in position. Once all aircraft are in position, lead may accelerate and climb the formation. If IMC and unable to establish positive radar identification of all preceding aircraft, abort using pre-briefed emergency procedures.

WARNING: All aircraft execute turns over the same geographical point. Maintain prescribed airspeeds, rate of turn, and rate of climb since these are the primary means of providing separation between aircraft if precipitation degrades radar station-keeping. If weather conditions preclude radar station-keeping, aircraft will depart individually and proceed to a VFR orbit fix for formation join-up.

18.60. Enroute.

18.60.1. Any aircraft unable to maintain formation position will notify the formation lead of the nature of the emergency and intentions. If you must depart the formation, break out in the safest direction 45 degrees from the base heading. After 1½ minutes (wings level) return to the base heading and comply with separate IFR clearance or proceed as required to a safe recovery.

18.60.1.1. If formation position can be maintained until receiving an individual ATC clearance, continue in position until clearance is received.

WARNING: After departing the formation, the aborting aircraft will climb or descend out of the formation block altitude prior to maneuvering across the flight path of the formation.

18.60.1.2. If an element lead aborts, the second aircraft of that element assumes the element lead position.

18.60.1.3. When an aircraft aborts, other aircraft within the section continue to maintain their position and level off at their original altitude; e.g., descending to a base altitude of 2,000 feet and number 2 aircraft aborts, the number 3 aircraft maintains a 3-mile position aft of the formation leader and levels off at 3,000 feet.

18.60.1.4. Loss of radar after join-up:

18.60.1.4.1. If IMC, the aircraft aborts.

18.60.1.4.2. If VMC, the formation lead may permit the aircraft to remain in the formation. In this case, maintain position by visual reference, briefed airspeeds, and verbal assistance from succeeding aircraft.

18.60.2. Level off to maintain 500 feet vertical separation with all aircraft using the same altimeter setting. Altimeter changes required enroute will be accomplished (on command) simultaneously by all aircraft in the section and will be repeated by each succeeding section lead.

18.60.2.1. Intermediate Level Off During Climb. Section lead levels off at the highest altitude in the assigned block (base altitude). The Number 2 aircraft levels off at base altitude minus 500 feet, Number 3 aircraft at base altitude minus 1,000 feet, etc. Last aircraft in the section reports level at his assigned altitude. When the formation is cleared to continue climb, the section leader announces it.

WARNING: Serial and section leads will not accept an intermediate level off that places follower aircraft below MEA. When ATC directs an intermediate level off, serial or section leads immediately advise the controller of the block altitude requirement, and confirm that it is available.

18.60.2.2. Level-Off for Cruise. Section lead levels off at the lowest altitude in the assigned block (Base Altitude). Number 2 aircraft levels off at base altitude plus 500 feet; Number 3, base altitude plus 1,000 feet, etc. Last aircraft in the section or serial calls entering the block and level at assigned altitude.

18.60.3. Plan the mission to ensure the last aircraft in the section is below cruise ceiling. Evaluate weight, temperature, weather, altitude, and distance prior to establishing a cruise airspeed. Section leads announce increase to cruise airspeed (if applicable) after the last aircraft in the section has reported level at assigned altitude.

18.60.4. When formations consist of more than one section, section leaders report once in the blind over each check-point on UHF and VHF assigned interplane frequencies using corridor reporting procedures. Plan reporting points no more than 30 minutes apart to allow sections to maintain planned spacing.

18.61. IFR Descent and Level Off. Slow aircraft to descent airspeed (if applicable) prior to descent. Each section begins descent at the same predetermined point. Section leads give a preparatory command and a command of execution. On the section lead's command, all section aircraft descend at cruise airspeed and 1,000 FPM. Lead aircraft levels off at base altitude. The number 2 aircraft levels off at base altitude plus 500 feet and number 3 aircraft at base altitude plus 1,000 feet, etc.

WARNING: Do not accept circling turns during descent in instrument conditions. Maintain briefed airspeed, rate of turn, and rate of descent as these are primary means of providing separation between aircraft if radar station-keeping is degraded.

18.62. VFR Recovery From IFR Formations. Maintain positive radar station-keeping separation until VMC. With ATC coordination, lead, will advise the formation of the expected recovery procedure.

18.63. IFR Recovery from Vertical IFR Formations. If terminal weather is forecast to be IMC, coordinate individual instrument approaches with ATC.

18.64. Transition Procedures.

18.64.1. Forming VFR in-trail from IFR conditions. If lead enters VMC while descending to base altitude, announce the base of the clouds and clears the formation to continue descent to base altitude. Formation aircraft will acknowledge and continue descent and advise the flight leader as they become VMC. After all aircraft report VMC, the formation leader clears the flight to join VFR in-trail, simultaneously reducing briefed low-level airspeed. VFR-rejoin during other phases of flight may be accomplished at the formation lead's discretion.

18.64.2. VFR to IFR Transition. Post drop IFR vertical assembly is accomplished from a series of preplanned ascent points. These ascent points are planned to afford 5-minute separation between sections. Before reaching the ascent point, section leaders give the preparatory command. Upon reaching their ascent point; the leader simultaneously gives the command of execution, turns to intercept the preplanned course, accelerates to briefed airspeed, and begins climb schedule. Succeeding aircraft initiate turn, accelerate, and begin climb schedule at 20-second intervals.

WARNING: The course interception angle will not be less than 30 degrees or more than 45 degrees to the preplanned course. ***EXCEPTION****:* Section lead may use less than 30 degrees of intercept, if required by mission profile.

NOTE: Plan a large enough angle between inbound course to ascent points and inbound course to enroute departure point to allow section aircraft to attain 1 1/2 miles of separation. Space ascent points to provide 5-minute separation between section leaders.

Figure 18.5. SKE Low Altitude Approach.

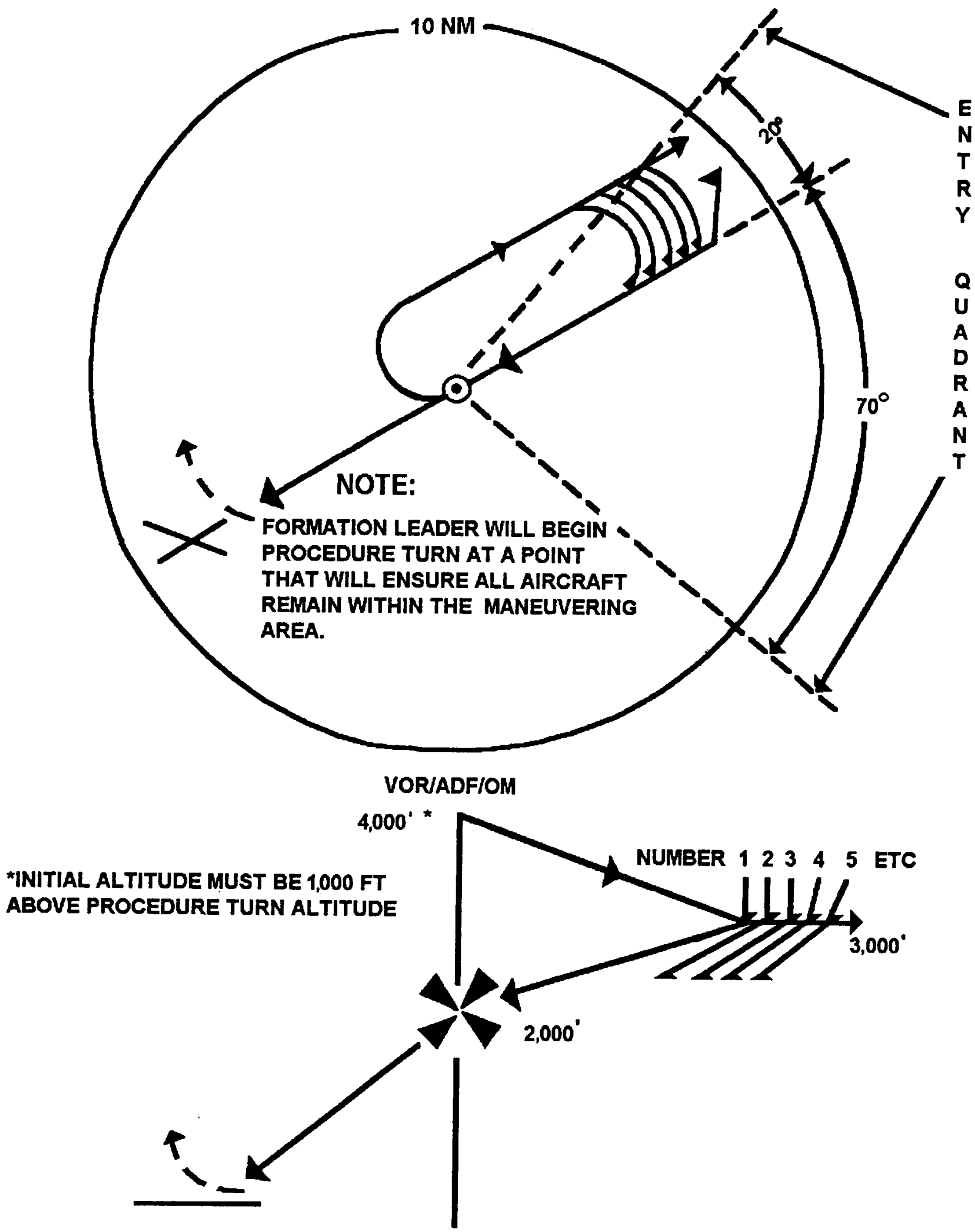
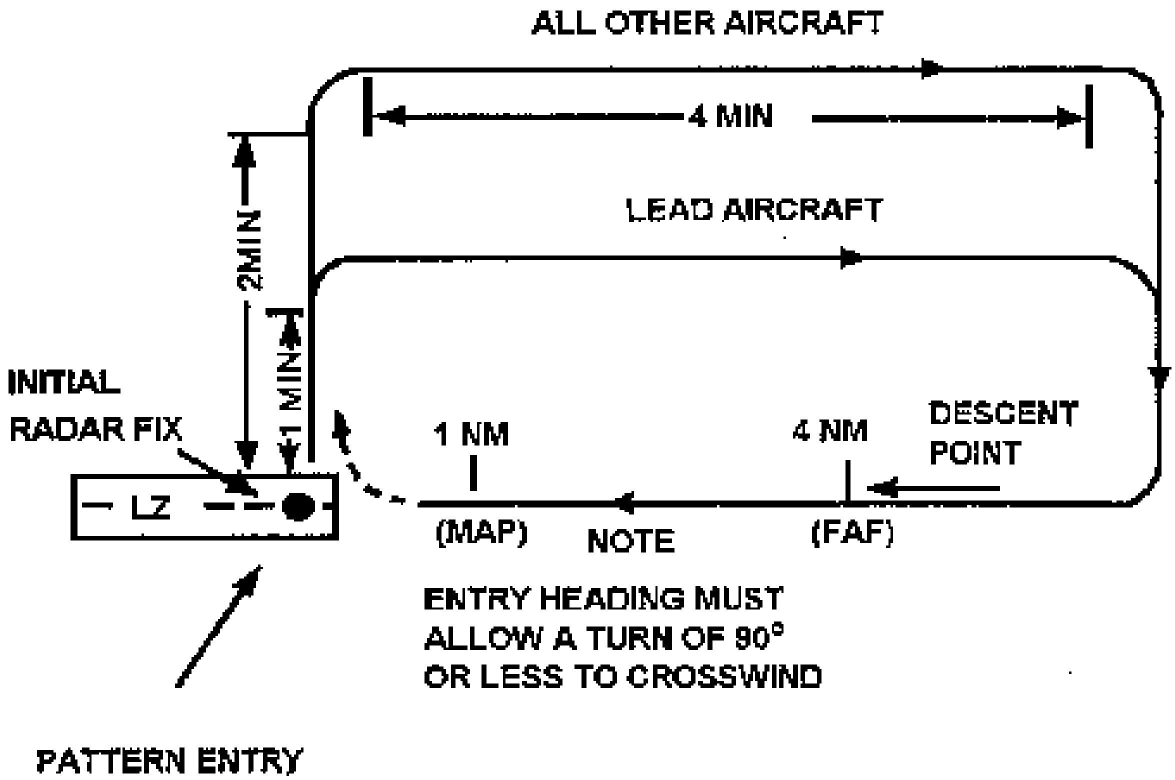


Figure 18.6. SKE Radar Approach From Holding Fix.



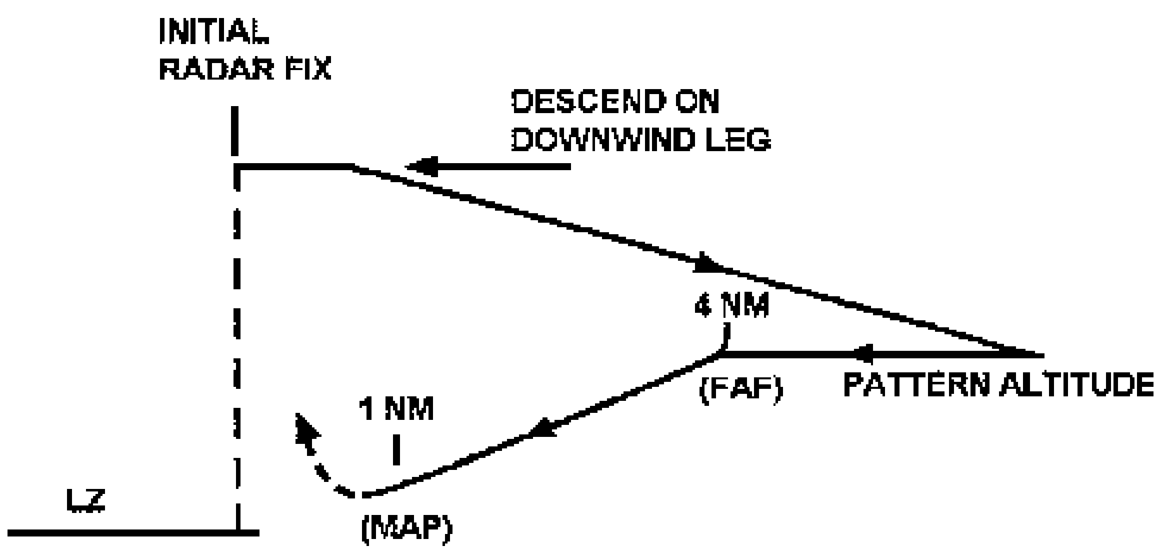


Figure 18.7. Airborne Station-Keeping Approach.

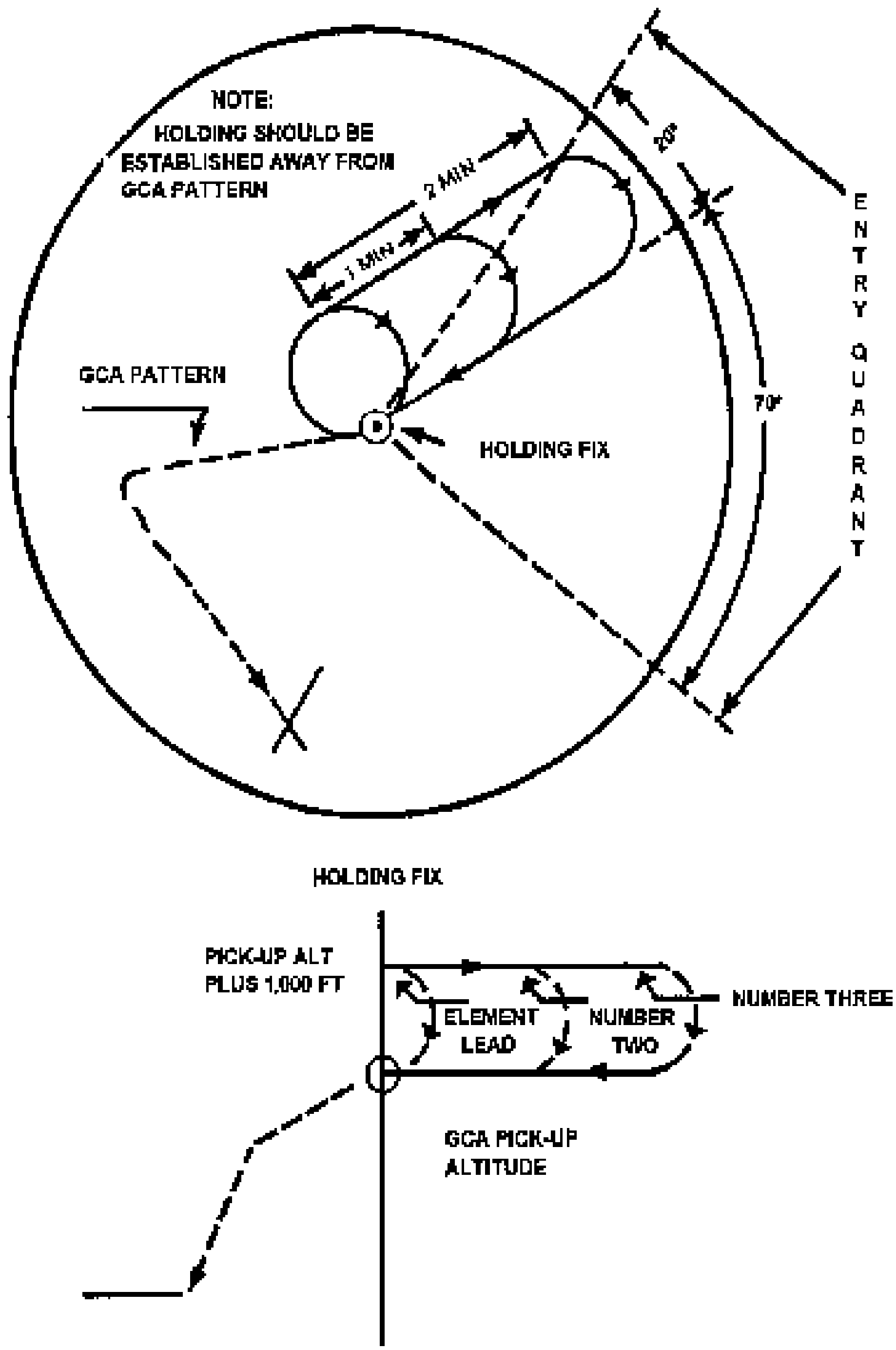


Figure 18.8. High Altitude Terminal Recovery.

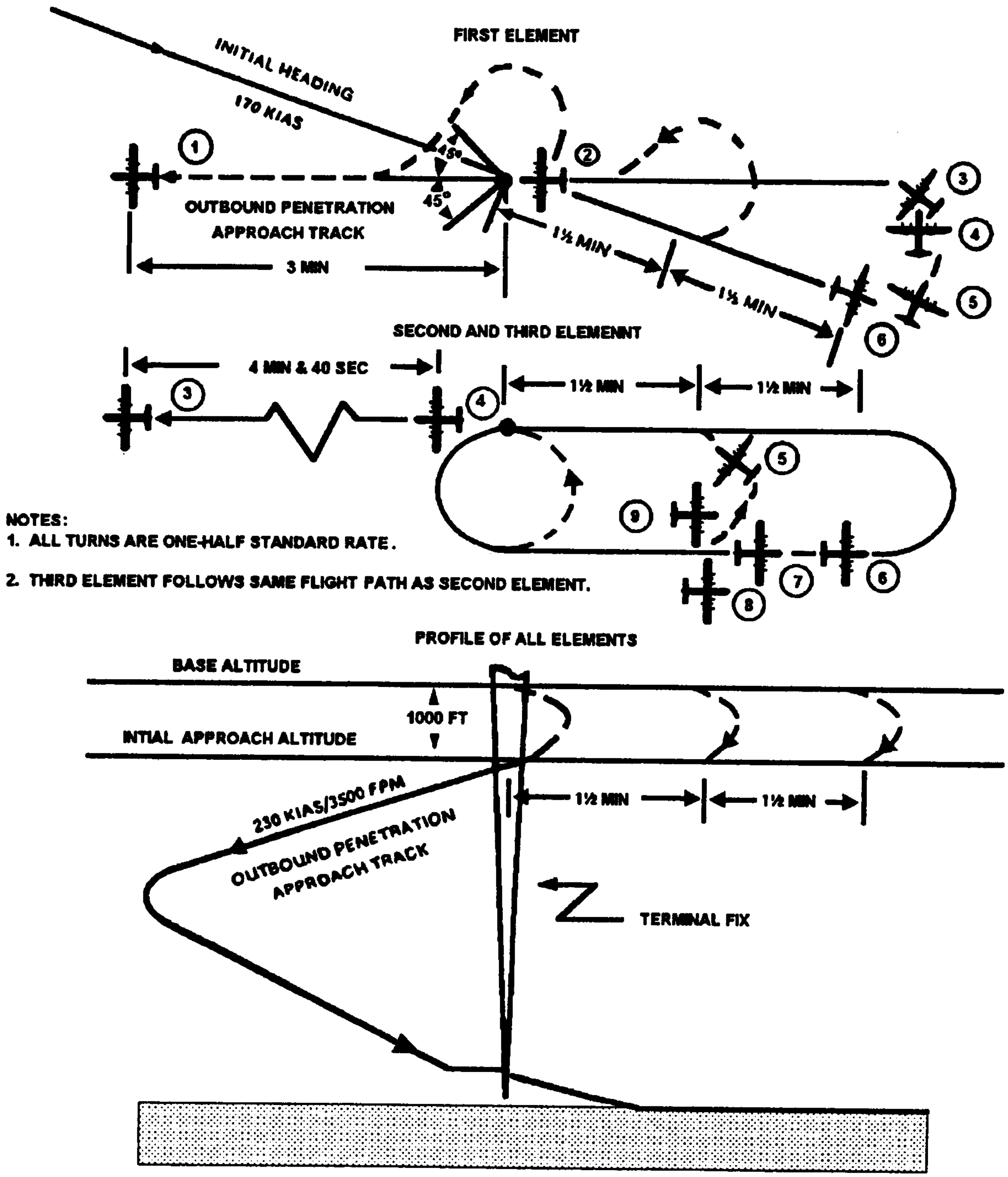
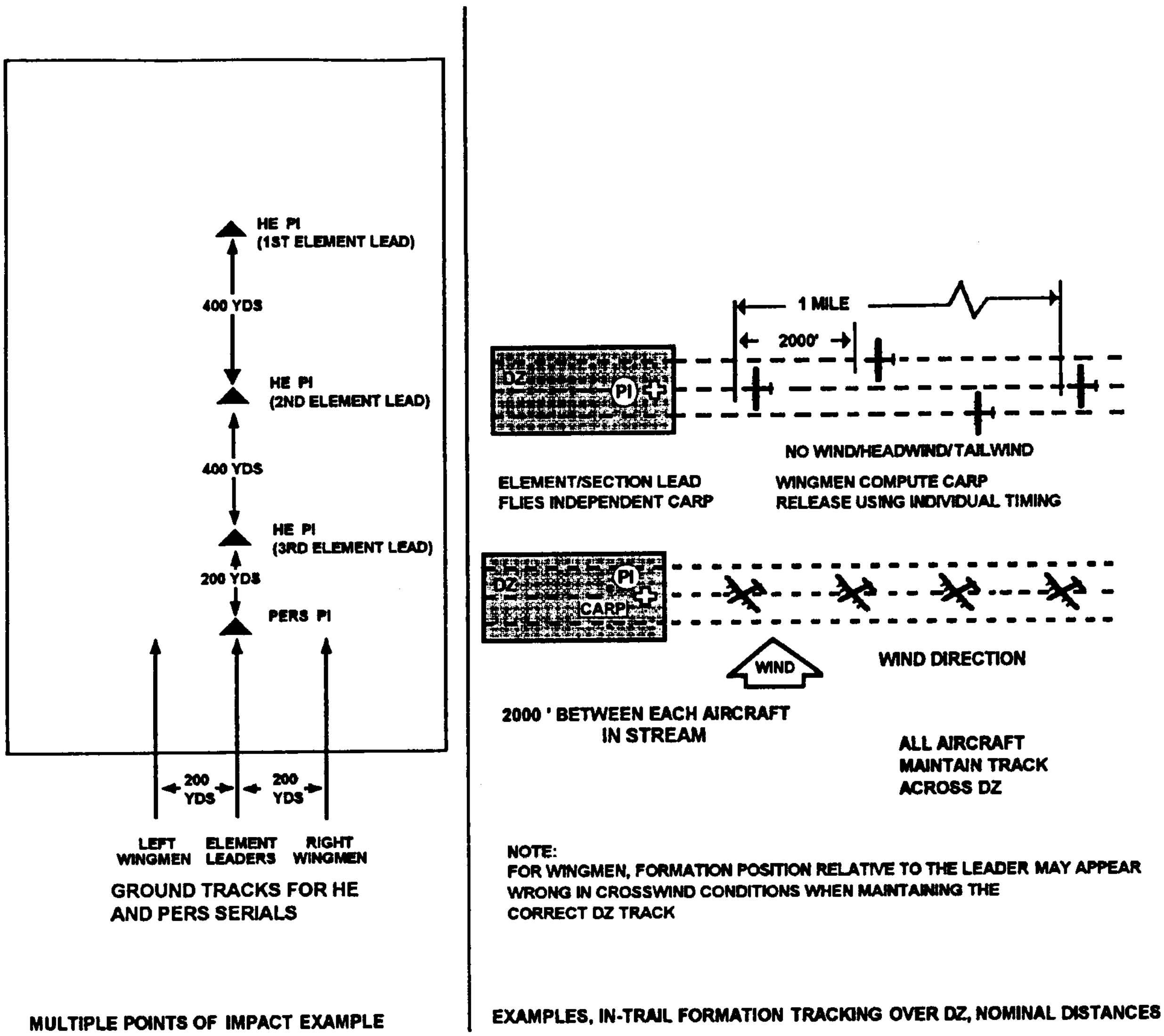


Figure 18.9. Drop Zone Alignment of Multiple Points of Impact (MPI) Examples.



Chapter 19

AIRDROP

Section 19A—Pre-Flight Procedures.

19.1. General. This chapter prescribes C-130 employment procedures for all airdrop operations. Additional formation procedures and restrictions are **Chapter 18**.

19.1.1. Airdrop above 5000 feet AGL. Equipment and CDS drops performed above 5000 AGL will be made using one of the following methods: AWADS, Ground Radar Aerial Delivery System (GRADS), or a radar beacon airdrop. A SKE wingman may execute a SKE timing drop provided the leader navigates to the release point by AWADS, GRADS, or a radar beacon.

19.2. Identification of Airdrop Items. It may be necessary to identify items that are not dropped or land off the DZ in unsecured areas.

19.2.1. Identify supplies or equipment by the following class numbering system:

19.2.1.1. Class I - Subsistence.

19.2.1.2. Class II - Individual equipment.

19.2.1.3. Class III - POL.

19.2.1.4. Class IV - Construction materials.

19.2.1.5. Class V - Ammunition (include the type):

19.2.1.5.1. Type "A" - Small arms.

19.2.1.5.2. Type "B" - Mortars.

19.2.1.5.3. Type "C" - Artillery.

19.2.1.6. Class VI - Personal demand items.

19.2.1.7. Class VII - Major end items (vehicles, howitzers, etc.).

19.2.1.8. Class VIII - Medical supplies.

19.2.1.9. Class IX - Repair parts.

19.2.1.10. Class X - Non-military programs (i.e. agricultural supplies).

19.2.2. Airdrop loads may also be identified by the following internationally recognized color coding system for combined operations:

19.2.2.1. Red - Ammunition and weapons.

19.2.2.2. Blue - Fuel and lubricants.

19.2.2.3. Green - Rations and water.

19.2.2.4. Yellow - Communications equipment.

19.2.2.5. White (or Red Cross on white background) - Medical supplies.

19.2.2.6. Black and white stripes - Mail.

19.3. Airdrop Kits. The loadmaster will carry enough equipment in the airdrop kit to satisfy load or mission requirements. Minimum contents of airdrop kits will include cloth-backed pressure sensitive tape, masking tape, 1/2-inch tubular nylon cord, 550 cord, 5 cord, 80 pound cotton webbing, one carabiner (NSN 4240-01295-4305 or equivalent carabiner with a locking mechanism), and two small G-14 clevises.

19.4. Joint Inspection.

19.4.1. The loadmaster will complete the applicable DD Form 1748, **Joint Air Drop Inspection Records**, before takeoff (see AFJI 13-210 for specifics) and verify the accuracy of cargo and troop documentation.

NOTE: Reject loads with inaccurate or unavailable weights, or loads hazardous to flight. Equipment not rigged per 13C-series technical orders (TO) or Joint Special Operations Command (JSOC) 350 series manuals, requires a waiver from the appropriate MAJCOM Tactics agency/division.

19.4.2. If loads to be airdropped (and loads to be airlanded) are carried at the same time, see the restrictions listed in **Table 19.1.**. These restrictions are designed to prevent airland loads from interfering with airdrop rigging equipment.

Table 19.1. Load Planning Restrictions.

	RESTRICTIONS	MINIMUM DISTANCE (INCHES)
1.	ANCHOR CABLE HEIGHT FROM AIRCRAFT FLOOR	80"
2.	RETRIEVER WINCH CABLE/PULLEY FROM AIRCRAFT FLOOR	84"
3.	DISTANCE BETWEEN ANCHOR CABLES; (a) CDS OR EQUIPMENT (b) PERSONNEL 1 (1) FORWARD BULKHEAD (2) INTERMEDIATE SUPPORTS	 108" 6" INBOARD, 64" OUTBOARD 76" INBOARD, 76" OUTBOARD
4.	AIRLAND CARGO HEIGHT	CANNOT INTERFERE WITH OVERHEAD RIGGING EQUIPMENT CDS ONLY -- 80" HEIGHT[2]
5.	CARGO LOCATIONS ON PERSONNEL AIRDROPS (STATIC LINE OR HALO)	TROOP DOOR EXIT: NO CARGO BETWEEN FS 657-737. RAMP EXIT: FORWARD OF FS 700.
6.	PERSONNEL DISTANCE FROM AIRDROP RIGGING EQUIPMENT	60"
7.	SAFETY AISLE TO REAR OF AIRCRAFT[3]	ALL MISSIONS, ALONGSIDE OR OVER TOP OF CARGO
8.	ACCESS TO DUAL RAIL CONTROL HANDLES	CANVAS SEATS NOT USED 1L AND 2L
9.	ACCESS TO OPERATE CDS EQUIPMENT	CANVAS SEATS NOT USED 1L AND 2L.

NOTE: 1. Personnel airdrops may be performed with only one troop door configured for airdrop with user concurrence.

NOTE: 2. Will not exceed 80" within 12" either side of retriever cable. Height of cargo outside of the 12" left and right (total 24") may exceed the 80" height limitation, but will not interfere with overhead rigging equipment.

NOTE: 3. CDS and heavy equipment configuration. A maximum of three rows of canvas seats may be used. The remaining vacant row serves as a safety aisle. All sidewall seats will be raised or stowed in the wheel-well area when airland pallets and vehicles are located within this area and exceed 96" width.

19.5. Verification of Load Information. The navigator will verify the actual number and type of parachutes, load weights, sequence of extraction, and position of loads in the aircraft agree with planned CARP data. If an individual load has a different type or number of parachutes from other loads, compute a CARP for each load to ensure all loads will land on the DZ. Base drop altitude on the item requiring the highest drop altitude.

19.6. Marking Airdrop Loads. For training missions (e.g. unilateral, exercise, or JA/ATT) the navigator will mark all equipment and standard airdrop training bundles with the aircraft call sign and date. If more than one load is dropped on the same pass, mark loads with order of exit from aircraft. Markings will be placed on the extracted end of the load, and also between the extraction parachute and attachment to the floor. (***EXCEPTION***: If more than one CDS bundle is dropped on the same pass, mark only the first container out.

19.7. DZ Markings. Plan and coordinate DZ markings according to AFI 13-217.

19.8. Safety Equipment.

19.8.1. Personnel required to be mobile in the cargo compartment during low-level phases will wear protective headgear from the combat entry point to the combat exit point if an actual threat is briefed. ***EXCEPTION:*** Personnel performing water jumps. All other personnel will be seated with the seat belt fastened. Check helmet boom mike during preflight. Loadmasters will lower their helmet visor (except when NVGs are used) before opening any doors and keep them lowered until doors are closed. As a minimum, the helmet will be worn from the start of the pre-slowdown checklist until the completion of the drop checklist. Loadmasters will be on interphone from completion of pre-slowdown checks until completion of the drop checklist. ***EXCEPTION:*** For heavy equipment airdrop, both loadmasters will be on interphone prior to retracting the left rail locks in case of a loose platform.

19.8.2. During airdrops, loadmasters will wear either a restraint harness, or a parachute, from the pre-slowdown checklist until doors are closed and locked.

WARNING: During the aircrew briefing, the AC will brief the loadmaster(s) when the mission profile requires flight below 800 feet AGL with the door(s) open.

NOTE: Loadmasters must wear a restraint harness when performing duties near an open exit above 14,000 feet MSL or below 800 feet AGL.

19.8.3. When used, fit the restraint harness and adjust the lifeline before flight as follows:

19.8.3.1. Troop door personnel drops. Connect the hook to tiedown ring 26D and adjust the lifeline to allow mobility only to the troop door for installation of the paratroop retrieval strap/bar and to accomplish other emergency procedures. When dropping with centerline vertical restraint (CVR) sections 2 and 3 installed, connect the hook to the CVR tiedown ring located near tiedown ring 25D.

19.8.3.2. Troop door SATB drops. Connect the lifeline as described in paragraph **19.8.3.1.**. or to a floor/dual rail tiedown ring at FS 657 and adjust to allow mobility only to the troop door being used.

19.8.3.3. Ramp and door operations. Connect the hook to a floor/dual rail tiedown ring at FS 677 and adjust the life-line to allow mobility to FS 835.

WARNING: Except for an actual contingency, towed trooper, or emergency that threatens the survivability of the aircraft and crew, the restraint harness will not be disconnected or lengthened to a point that would allow the loadmaster to fall outside the aircraft.

19.8.4. Loadmasters will wear a life preserver unit (LPU) for operations over bodies of water when doors are open and a parachute is worn instead of a restraint harness.

19.8.5. During an airdrop, occupants in the cargo compartment will either have a seat belt fastened, wear a restraint harness, or wear a parachute before doors are opened. (***EXCEPTION:*** Flight examiner loadmasters are exempt from wearing a parachute or restraint harness while conducting flight evaluations provided they do not go aft of FS 677.) For static line jumps, static lines are attached to anchor cables before doors are opened. (**EXCEPTION:** Jumpers exiting on subsequent passes (racetracks) may stand and hook up with doors open if they are forward of the aft edge of the wheel wells (FS 617.)

NOTE: Do not use flight deck restraint harness for airdrops.

19.8.6. Two additional parachutes, not including those required for aircrew, will be aboard the aircraft for training missions performing personnel airdrops. These parachutes will be available for Army safety personnel use. User safety personnel will provide their own parachutes for contingency missions.

19.9. Secure Enroute Communications Package (SECOMP). SECOMP is a dedicated secure communications system provided by and in support of the user while enroute to the objective area. Use of SECOMP will cease at the discretion of the AC if it interferes with either aircraft equipment or an aircraft emergency condition.

19.10. Airdrop Weather Minimums and Wind Restrictions. Comply with published AFI 11-202V3 and FLIP VFR weather minimums for visual airdrops. For non-CONUS VFR airdrops, comply with host nation VFR criteria if more restrictive than AFI 11-202V3. The following weather minimum criteria apply for IMC airdrop operations:

19.10.1. Peacetime.

19.10.1.1. Unilateral airdrop training operations. The Air Force drop zone control officer (DZCO) will cancel drops when weather conditions over the DZ are less than 300-foot ceiling and one-half mile ground visibility.

19.10.1.2. Joint airdrop training operations. Weather minimums are at the discretion of the user.

19.10.2. Contingency and Combat. Weather minimums are at the discretion of the theater or task force commander.

19.10.3. There are no altitude wind restrictions for airdrops. If surface winds are not provided, altitude winds may influence the jumpmaster's decision to drop personnel. See AFI 11-231 for surface wind restrictions.

Section 19B—Flight Procedures

19.11. Enroute.

19.11.1. TOT control may be accomplished by airspeed adjustments, flying planned alternate legs to gain or lose time, using timing triangles, flying inside or outside course line, adjusting slowdown point, or other appropriate techniques that fit the situation.

19.11.2. Prior to each turn-point, the navigator will brief the course and altitude for the following leg.

19.11.3. Normally, plan to depart over or abeam the IP, offset for the CARP, and on a drift corrected heading. If the threat situation demands, terrain masking procedures may be required until stabilized on drop altitude.

19.11.4. If the navigator adjusts slowdown, advise the formation by the pre-briefed signal. The aircraft must be level at drop altitude and on drop airspeed by green light time. For personnel airdrops, the pilot must be aware of paratroopers standing in the back and avoid drastic pitch or bank changes during slowdown.

19.11.5. At slowdown, reduce power. As airspeed permits, extend flaps to 50 percent and slow to 140 knots indicated airspeed (KIAS). If a climb is required, climb at 140 KIAS. If a descent to drop altitude is required, reduce power and maintain level flight. As airspeed permits, extend flaps to 50 percent and descend at 140 KIAS. Upon reaching drop altitude, assume drop airspeed. For CDS drops, reset flaps per the CDS flap setting charts shown in the abbreviated checklist. Anticipate an increase in drift as the airspeed decreases.

19.12. Tactical Checklists.

19.12.1. Amplified tactical checklists are at the end of this chapter. The combat entry checklist will be accomplished prior to entering the tactical or threat environment. The combat exit checklist is accomplished when leaving the tactical environment.

19.12.2. During the aircraft commander's crew briefing, the pilot, navigator, and loadmaster will coordinate appropriate times or geographical location for execution of all tactical checklists. The time required by the loadmaster will determine when checklists must be accomplished enroute. Complete all items of the preceding checklist before beginning the next checklist.

NOTE: Avoid use of the word "green" or "light" from the slowdown checklist until arriving at the release point. "Green light" must be seen and heard by the loadmaster for all drops prior to releasing the load.

19.12.3. The "twenty minute", "ten minute", "one minute", and "five second" advisories are required for all personnel airdrops. Only the "one minute" and "five second" advisories are required for equipment and CDS airdrops.

19.12.4. The navigator will give accurate time advisories regardless of the tactical checklist in progress. Advisories are based on planned TOT up to slowdown. After this point, all advisories are based on green light time from the DZ.

NOTE: During personnel airdrops, the aircraft must be at or above drop altitude and stable not later than one minute out (two minutes out for jumpmaster directed drops) to allow the jumpmaster access to the paratroop door.

NOTE: The loadmaster will notify the aircraft commander when an emergency condition exists in the cargo compartment, complete the required emergency checklist and report completion of the malfunction checklist or status. Normal tactical checklists are resumed if possible. If not possible, proceed with the completion of drop checklist.

19.13. Airdrop Altitudes and Airspeeds. See **Chapter 16** of this AFI for specific airdrop altitudes and airspeeds. The aircraft must be level at drop altitude and on drop airspeed by green light time. Slowdown during personnel drops should be planned to allow jumpmaster access to paratroop doors NLT 1-minute before TOT (2-minutes for jumpmaster directed drops).

19.14. Navigating to the Release Point.

19.14.1. Once the pilot and navigator jointly confirm the CARP location and track required, the pilot is responsible for maintaining the desired track over the DZ. The navigator will control the "green light" and "red light" timing and continually cross-check the offset distance.

19.14.2. Five seconds prior to release, the navigator will give the preparatory "five seconds" advisory and call "green light" at the release point. The pilot not flying the aircraft will turn on the green light and simultaneously depress the ADS button if required. During the drop, the pilot will make any small corrections required to maintain DZ track. The navigator will monitor the timing for usable DZ length and call "red light" at the expiration of that time. The loadmaster will advise the crew when the load is clear or report any delay or malfunction.

19.14.3. Airdrops should cease at the navigator's "red light" call during peacetime operations. During contingency or combat operations, the user will decide whether troops or equipment may exit after "red light" and advise the airlift planners, who will brief the crew.

19.15. No Drop Decisions.

WARNING: Should the crew believe the drop will occur outside of safe parameters, they will call “no drop” and ensure the red light is illuminated.

19.15.1. Before the "one minute advisory" call, any crew member observing a condition that could jeopardize a safe drop will notify the aircraft commander. After the one minute advisory any crew member observing a condition that could jeopardize a safe drop will transmit a "no drop" call on interphone. The copilot and loadmaster will acknowledge the no-drop call. The crew will perform the completion of drop checklist after "no drop" is called. AWADS/SKE element leaders will continue to provide signals for wingmen as long as the no-drop situation does not effect the wingmen or formation.

NOTE: The loadmaster will accomplish the applicable no-drop procedures before performing the completion of drop checklist.

NOTE: Checklist may still be in progress after the "one minute advisory". A no-drop will be called if checklist is not complete prior to the "five-second" call.

19.15.2. If surface winds are unknown during personnel airdrops, advise the jumpmaster and Army airborne mission commander when drop altitude winds exceed 30 knots. The decision to drop is at user discretion.

19.15.3. The Army drop zone safety officer (DZSO) determines the suitability of surface conditions on the DZ for airdrops during joint training operations. They pass the drop or no-drop decision to the AF DZCO not later than one minute prior to the drop. When AF personnel are involved, the AF DZCO will cancel drops when surface conditions are unsafe.

19.16. Drop Zone Communications. Limit radio transmissions with the DZ to those required for safety of flight or essential to force employment. DZ wind and weather information may be broadcast in the blind at a pre-coordinated time.

19.16.1. Drop clearance is normally inherent with mission clearance. Drop clearance in VMC is confirmed with proper DZ markings. In IMC, ZM reception, radar beacon reception, or other briefed/coordinated methods are considered clearance to drop.

19.16.2. In VMC, no-drop or mission cancellation is communicated by the absence of coordinated markings, observation of the block letter "X", red smoke, red flares, an authenticated radio transmission from the STT/DZCO, or other coordinated method. The temporary postponement of an airdrop may be indicated by placing two parallel bars formed by panels at the base of the block letter identifier parallel to the DZ axis, or another coordinated signal. In IMC, a no-drop, postponement, or mission cancellation is communicated by an authenticated radio transmission or other coordinated method.

19.16.3. During joint airborne operations, the Army ground commander must be able to determine the number of personnel (Alibis) who did not jump. When required, the aircraft commander/mission commander will only report the total number of Alibis to the STT or DZST at the completion of the final pass over the DZ. If relay of this information conflicts with formation procedures or in any way jeopardizes safety, delay the report as necessary. This guidance is for peacetime exercises only and not intended for contingencies or when the OPORD, SPINS, etc., directs radio silence.

19.17. Drop Zone Race Track/Dry Pass Procedures. Race tracks are not recommended for combat operations. If race tracks must be flown, accomplish all checklists beginning with the completion of drop checklist followed by the pre-slowdown checklist. Checklists may be compressed during race tracks, but the AC must ensure the loadmaster has adequate time to complete all items before the drop is initiated. The one minute advisory is never compressed and is always given on time. Procedures for contingency and or combat operations depend on mission requirements and the tactical situation. Thoroughly brief all planned race track procedures. Dry pass procedures can be used when conditions preclude an actual airdrop. The potential for a dry pass should be recognized during the mission planning process. If a dry pass is desired it should be thoroughly briefed and understood by all crewmembers. Areas of consideration include but are not limited to; checklist terminology, use of FCIs, altitudes/airspeeds, aircraft configuration, and whether or not doors will be opened.

NOTE: Units should develop and publish standardized race track and dry pass procedures for use at local DZs.

Section 19C—Methods of Aerial Delivery

19.18. General. Methods of low-altitude visual and IMC airdrops are described in this section. Additional airdrop information is contained in AFI 11-231. Methods will not be mixed and will be thoroughly briefed and understood by all participants.

19.19. Visual Airdrops. The navigator will plot the release point on an appropriately scaled map, sketch, diagram, or aerial photograph and direct the pilot to this point.

19.20. Ground Marked Release System (GMRS). The supported unit is responsible for computing a release point and providing ground markings (panels or lights). The airdrop is made over this marker or abeam a flanker marker as determined during joint planning. The navigator will compute a CARP to predict the approximate location of the release point to aid line-up during the run-in.

NOTE: The user assumes responsibility for airdrop accuracy during GMRS drops.

19.21. Verbally Initiated Release System (VIRS).

19.21.1. During VIRS, ground personnel compute the release point, provide verbal steering guidance to the aircraft, and give the release call when the aircraft arrives over the predetermined point by using the following terminology:

NOTE: VIRS is only performed by qualified CCT or TALO personnel.

19.21.1.1. "**turn left/right**"- use a half standard rate turn unless otherwise specified

19.21.1.2. "**stop turn**"- self explanatory

19.21.1.3. "**standby**"- indicates approximately ten seconds prior to the release

19.21.1.4. "**execute, execute, execute**"-directs release of the load

19.21.2. Upon hearing the term "STANDBY", the navigator states "FIVE SECONDS" on interphone. On the first "EXECUTE", the navigator calls "GREEN LIGHT", and the copilot activates the green light switch and depresses the ADS button, as required.

19.21.3. The ground party must maintain visual contact with the aircraft during the approach inbound.

NOTE: The ground party accepts responsibility for drop accuracy.

19.22. Jumpmaster Directed (JMD) Personnel Release Procedures.

19.22.1. During JMD, the jumpmaster determines the release point (RP) mathematically or by wind drift indicator. The jumpmaster directs the aircraft to the RP using steering commands to the aircrew. Jumpmaster directed drops are limited to single ship airdrop operations only. These drops may be performed by qualified AF or sister service jumpmasters (or trainees under supervision of qualified personnel). This procedure is restricted to STT and Pararescue (PJ) personnel, Navy SEALS, certain EOD units, and Army Special Forces. JMD procedures are authorized only during military free fall (MFF) operations and HQ approved static line operations. Units will receive approval notice through the mission tasking directive from AMC TACC/XOOMJ for AMC-directed missions or from the appropriate theater command and control agency, annotated on JA/ATT Form 612R, tasking order, etc.. The following conditions apply:

19.22.1.1. AF approved static line JMD drops for CCT and PJ (including STT) is limited to jumpmaster training, personnel/RAMZ (boat) deployments, and pararescue operations/training.

19.22.1.2. Army Special Forces require their headquarters approval for special high altitude static line jumps or for static line training in preparation for a mobile training team.

19.22.1.3. The jumpmaster's parent service/user accepts all responsibility for the accuracy of the drop, plus any potential injuries/damage to equipment.

19.22.1.4. Specific in-flight visual signals, verbal signals, and interphone procedures between the jumpmaster, loadmaster, and pilot are coordinated during the pilot, loadmaster and jumpmaster briefing.

19.22.1.5. Navigators will still accomplish CARP or high altitude release point (HARP) calculations to back up the computations and in-flight directions given by the jumpmaster.

19.22.1.6. Navigators will update the jumpmaster in-flight on actual wind information and any changes to the crew's preflight computed CARP location.

19.22.2. After the slowdown checks are completed, the loadmaster permits the jumpmaster access to the door to begin "spotting procedures." The slowdown should be adjusted to allow the jumpmaster to begin spotting procedures not less than two minutes out. The jumpmaster visually relays steering signals to the loadmaster, who verbally relays these signals to the pilot. The jumpmaster may spot from the aircraft ramp or a paratroop door.

WARNING: Aircraft ramp and door and paratroop doors will not be open at the same time.

19.22.3. One minute prior to the navigator's release point (or as briefed), the copilot turns on the green light to indicate clearance for the jumpmaster to make a final decision as to the exact exit point. Jumpers may exit on the jumpmaster's direction while the green light is illuminated. The red light is turned on at the end of the navigator's computed usable DZ distance and time or when the last jumper or load exits, whichever comes first. No jumpers should exit after the red light is turned on.

19.22.4. JMD releases will not be mixed with any other type of airdrop method, i.e., GMRS, VIRS, or standard CARP drops. If JMD drop procedures are called for, the crew will follow the jumpmaster's instructions, while adhering to normal safety concerns. Should the crew believe the drop will occur outside of safe parameters, they will call “no drop” and ensure the red light is illuminated.

19.22.5. Pararescue specialists are authorized to deploy streamer or spotter chutes to enhance the success of the operation.

19.23. AWADS Airdrops. AWADS-equipped units are authorized to make airdrops using AWADS equipment in VMC or IMC.

19.24. Radar Beacon Airdrops. Radar beacon airdrops provide an alternate means of performing IMC airdrops by using a radar beacon placed on the DZ. The navigator directs the aircraft to the DZ using the beacon mode of the aircraft radar. Procedures are in AFI 11-231, *Computed Air Release Point Procedures*. Use of these procedures in IMC during peacetime must be approved by NAF/DO for active duty units and either HQ AFRC/DO or ANG/DOO for AFRC/ANG units. The AOC/ALCC may approve IMC radar beacon airdrops for exercises or for contingency and combat operations.

19.25. Ground Radar Aerial Delivery System (GRADS). See AFI 11-231 and the following; GRADS is an IMC airdrop method using fixed radar facilities to provide navigational guidance to position the aircraft over the navigator's CARP. GRADS drops are not recommended during periods of heavy precipitation.

19.26. Ground Control Approach/Computers Aerial Delivery System (GCA/CADS). See AFI 11-231 and the following; GCA/CADS is an IMC airdrop method using fixed radar facilities to provide navigational guidance to position the aircraft over a timing point normally about two miles out from the DZ. The navigator directs the aircraft to the CARP from the timing point using a combination of timing and the computer.

19.27. SCNS/SKE/ZM Airdrops.

19.27.1. SKE-equipped units are authorized to make SCNS/SKE/ZM drops in IMC or VMC provided:

19.27.1.1. The ZM is physically located at the DZ. The ZM should be placed within 1500 meters of the PI but as close as possible for maximum accuracy.

19.27.1.2. SCNS/SKE/ZM system is operational, SKE INVALID message is not present, and dynamic deltas are displayed with “S” selected as the drop reference.

NOTE: SKE ZM symbol will also be displayed on the PPI/DVST. The symbol may appear intermittently and should not be used as a means of validating or invalidating the mix.

19.27.2. SCNS/SKE/ZM procedures.

19.27.2.1. Select “S” as DROP REF on AIRDROP 2-3 page.

19.27.2.2. Program the location of the ZM as a range and magnetic bearing from the PI way-point.

19.27.2.3. Select bottom antenna.

NOTE: Top antenna may be used if bottom antenna fails. However, aircrews must realize that the zone marker signal may be lost as the aircraft approaches the DZ due to line of sight restrictions.

19.27.2.4. If SLOT ENABLE is used, SLEN slot number 01.

CAUTION: Do not assign slot numbers 01 or 02 to aircraft. The zone marker uses both of these for synchronization and to extend its range from the master to 20 NMs.

NOTE: If more than one formation is using the same ZM on the same frequency, only one formation at a time can have slot 01 enabled. Coordination between serials is essential to avoid TWO MASTER or TWO IN SLOT indications.

19.27.2.5. Set the ZM MODE SELECT switch to ON.

NOTE: The ZM must be within 20 NM of the formation master in order to synchronize. The master should be as close to the front of the formation as possible in order to get steering information from the zone marker early.

19.27.2.6. Once the SCNS displays sensitive steer information, the navigator verifies a valid mix (dynamic deltas are displayed and SKE INVALID message is not present).

CAUTION: ZM steering information is not considered reliable until a valid mix is received for a minimum of 45-seconds.

NOTE: Because numerous alert messages appear on the screen during the run-in, regular attention must be paid to scanning for SKE INVALID message. Clear alert messages immediately, as the SKE INVALID message does not override other warnings.

19.27.2.7. Cross-check the displayed deltas and cross-track with radar presentation or other available instruments.

19.27.2.8. Cross-check SCNS time to go with actual ETA.

NOTE: If valid mix is not received by one minute prior to drop (frozen deltas and/or a SKE INVALID message is displayed), a no-drop will be called. If VFR conditions exist, a visual drop may be accomplished.

19.27.2.9. Complete the drop.

NOTE: SCNS/ZM capable wingmen will maintain formation position off the TWS and drop using the ZM. Wingmen may drop using SKE timing procedures if not receiving a valid zone marker mix.

Section 19D—High Altitude Airdrop Procedures

19.28. General. High altitude personnel and equipment drop procedures may be employed during clandestine operations or in areas where small arms threats preclude conventional low-altitude deliveries. Airdrops conducted above 3,000 feet AGL are considered high-altitude drops. Only essential personnel who have accomplished appropriate physiological training described in AFI 11-403 are permitted on mission aircraft for airdrops above 10,000 feet MSL.

19.28.1. Preflight. In addition to normal planning requirements, analyze preflight winds to determine the best DZ course. When possible, the course should be into the wind. Select prominent terrain features within the drop area to aid positioning the aircraft on the inbound course and to help determine the release point.

19.29. Oxygen Requirements.

19.29.1. A continuous supply of 100 percent oxygen will be used by all personnel during unpressurized operations above 10,000 feet MSL. Crewmembers will follow established MAJCOM oxygen mask requirements.

19.29.1.1. EXCEPTIONS:

19.29.1.1.1. Students of the Military Free Fall School, Parachutist Course (MFFPC) and Military Free Fall Jumpmaster Course (MFFJM), may perform unpressurized operations between the altitudes of 10,000 feet MSL and 13,000 feet MSL without supplemental oxygen, for a period not to exceed 2 hours, with the following safety measures in place:

19.29.1.1.2. For MFF-PC Students: A suitably qualified USAF Physiology Technician (PT) will be onboard and positioned in the aft portion of the cargo compartment when aircraft is between 10,000-13,000 feet MSL for longer than 30 minutes. Unpressurized flights between these altitudes will not exceed 2 hours. The USAF PT will remain on 100% oxygen (or an appropriate air mix) throughout the unpressurized portion of the flight above 10,000 feet MSL. Under circumstances where a USAF PT is unavailable, a US Army 18 Delta Medic or USAF Pararescue trained and certified by HQ ACC/SGOP may be used. The role of the PT will be to monitor parachutists for signs of impairment resulting from hypoxia. If hypoxic impairment is suspected, the parachutist will be returned to the forward portion of the cargo compartment and administered 100% oxygen. Once symptoms and signs of hypoxia have been resolved, the parachutist may continue training. Instructors and jumpmasters will have 100% oxygen available (provided by the user) and will breathe from this supply whenever practicable.

19.29.1.1.3. For MFF-JM Students: There is no requirement for a USAF PT to be onboard for unpressurized operations between 10,000 and 13,000 feet MSL. However, the parachutists will breathe 100% oxygen for a period of at least 3 minutes, immediately prior to jumping if their time between 10,000 and 13,000 feet MSL exceeds 30 minutes. Supplemental oxygen will be supplied by an oxygen console provided by the Military Free Fall School.

19.29.1.2. All other parachutists may operate without supplemental oxygen during unpressurized flights up to 13,000 feet MSL provided the time above 10,000 feet MSL does not exceed 30 minutes each sortie. Jumpmasters may operate without supplemental oxygen for an additional 60 minutes within the 10,000-13,000 foot MSL envelope provided their duties do not include jumping. For unpressurized flight above 13,000 feet MSL, or exceeding the 30-minute envelope between 10,000 and 13,000 feet MSL, the use of an individual mask and regulator is required for all jumpers. The user is responsible for all supplemental oxygen requirements. Aircraft equipment will not be used by the parachutists.

19.29.2. When dropping from 18,000 feet MSL or higher, use prebreathing procedures. When the aircraft oxygen system does not provide sufficient oxygen regulators for all personnel, approved portable oxygen console(s) will be preflighted and installed in the aircraft. The console(s) will provide enough oxygen regulators for all parachutists and crewmembers not accommodated by the normal aircraft system.

19.29.3. All airdrops above 25,000 feet MSL require a waiver to AFI 11-202V3 for unpressurized flight, from HQ AFFSA/XO, 1535 Command Drive, Suite D305, Andrews AFB MD, 20331-7002 through MAJCOM/DOV. MA-1 portable oxygen units (with serviceable web carrying straps) equipped with A-21 regulators will be provided for each person aboard the aircraft except parachutists.

WARNING: No personnel will be exposed to unpressurized flight at or above 30,000 feet MSL more than three times each 7 days; in addition, they and must have a minimum of 24 hours between exposures.

19.29.4. Prebreathing requirements. All personnel will prebreathe 100 percent oxygen below 10,000 feet pressure altitude or cabin altitude on any mission scheduled for a drop at or above 18,000 feet MSL for times shown in **Table 19.2.**. Prebreathing will be completed before cabin altitude ascends through 10,000 feet MSL. All personnel will remain on 100 percent oxygen until cabin altitude is below 10,000 feet. A break in prebreathing requires the prebreathing period to be restarted, or the airdrop will be restricted to below 10,000 feet MSL. When prebreathing on the ground is required, a launch crew may assist the primary crew as needed to assure prebreathing requirements are met. Prebreathing will be conducted with a personally fitted oxygen mask attached to a helmet or approved adjustable head harness. Portable oxygen bottles may not be used for prebreathing.

NOTE: Quick don masks are emergency equipment and are not approved for prebreathing or high-altitude operations (at or above 18,000 feet MSL).

19.29.4.1. The likelihood of decompression sickness depends on three main factors: altitude, rate of ascent, and time of exposure at altitude.

Table 19.2. Prebreathing Requirements and Exposure Limits for High Altitude Operations.

Prebreathing Times				
Altitude	**Aircrews**	**Jumpers**	***Maximum Exposure Time Per Sortie**	**Maximum Sorties Per 24-Hour Period**
From FL 180 to FL 249	30 Min	30 Min	2 Hours	1
From FL 250 to FL 299	45 Min	30 Min HALO 45 Min HAHO	1 Hour	1
From FL 300 to FL 349	60 Min	60 Min	30 Min	1
FL 350 or above	75 Min	75 Min	30 Min	1

****NOTE:*** Maximum Exposure Time Per Sortie is considered to be any time cabin altitude exceeds 10,000 feet MSL. Personnel will conduct no more than two oxygen jumps per 24-hour period that do not require prebreathing (between 13,000 feet and 18,000 feet MSL) one of which, in the same 24 hour period, that requires prebreathing (18,000 feet MSL or above). (Example: Scenario 1: 2 x 17,500 feet MSL or Scenario 2: 1 x 24,999 feet MSL and 1 x 17,500 feet MSL).

19.29.5. The jumpmaster may dictate the use of supplemental oxygen by any or all jumpers at altitudes less than those listed. Parachutists transfer from the aircraft oxygen system or portable oxygen console to a personal oxygen system at approximately one minute before green light.

19.29.6. Pressurization Scheduling. Maintain cabin pressure at or below 10,000 feet until the pre-slowdown checklist (time for check may have to be adjusted) and until prebreathing is complete. Depressurization will not exceed 3,000 feet per minute. Slower rates are recommended if time allows. Ensure zero pressure differential before opening doors.

19.30. Loadmaster Requirements. Loadmaster requirements will be based on the following criteria:

19.30.1. Two loadmasters will be used on actual equipment drops utilizing the ramp and door.

19.30.2. Two loadmasters will be used on all HALO personnel drops (13,000 feet MSL and above).

19.30.3. One loadmaster may be used on HALO personnel drops (up to 13,000 feet MSL) when utilizing the ramp and door or, only one paratroop door is opened.

19.31. PT Requirements. PTs will support high altitude airdrop missions when requested by the mission frag order, the aircrew, or the user. At least 1 USAF PT is required per 16 jumpers, up to a maximum of 3 PTs, for all airdrops conducted at or above 18,000 feet MSL. Additional PTs will be required when PTs need training or a waiver is granted to exceed exposure limitations.

NOTE: The ACC Command Physiologist for Aerospace Physiology, 1 AMDS/SGPT, 45 Pine Street, Langley AFB VA, 23665-2080 may authorize variations to the PT-to-personnel ratio.

19.32. PT Duties.

19.32.1. PTs will fly as crewmembers as stated on aeronautical orders. When missions require a PT, the PT will be on interphone at all times. PT flight duty stations will be as required to monitor crewmembers, jumpers, and oxygen equipment. PTs will:

19.32.1.1. Preflight aircraft supplemental oxygen equipment.

19.32.1.2. Advise and aid loadmasters in positioning and securing oxygen equipment.

19.32.1.3. Brief crew and jumpers prior to the first mission on physiological problems that may be encountered, the importance of proper prebreathing, and any special requirements.

19.32.1.4. Advise the aircraft commander, crew, jumpers, and other personnel on use of oxygen equipment and on the depressurization schedule.

19.32.1.5. Monitor personnel, aircraft and supplemental oxygen equipment, and life support equipment.

19.32.2. The aircrew or the mission PT will notify HQ USAF/SGPA (DSN 858-4654), and HQ AMC/SGPA (DSN 576-2303) and appropriate Command Coordinator for Aerospace Physiology, of any physiological incident by the most expedient manner.

19.33. Conduct of Operations. All high altitude airdrop operations will be conducted IAW the amplified checklist in this chapter.

19.33.1. In addition to the pilot-jumpmaster briefing, the pilot or a representative will also brief the jumpmaster on the following:

19.33.1.1. Weather.

19.33.1.2. Emergency descent procedures and time to descend to 10,000 feet.

19.33.1.3. Pressurization schedule.

19.33.1.4. HARP and prominent terrain features.

19.33.1.5. DZ markings.

19.33.1.6. Time at which all mission personnel will commence prebreathing.

19.33.1.7. Duration of green light time.

19.33.2. For communications and signals, interphone and hand signals are the primary methods of communications. Written messages may be necessary in some instances to communicate with individuals not connected to the aircraft interphone. Loadmasters will carry pencil and paper and write out messages that cannot be dealt with by using hand signals. When dropping parachutists, the jumpmaster may monitor interphone. The loadmaster will coordinate the following hand signals with the jumpmaster:

19.33.2.1. Time advisories may be given to the jumpmaster by the loadmaster pointing to a watch and then indicating time advisory with the fingers.

19.33.2.2. A no-drop may be indicated by passing the forefinger across the throat.

19.33.2.3. Wind velocity on the DZ may be indicated by cupping hand in front of oxygen mask and indicating with fingers the number of knots.

19.33.3. Crewmembers will wear parachutes or restraining harnesses in the cargo compartment any time the doors are open during high altitude airdrop operations. Safety harnesses are worn on airdrops conducted above 14,000 feet MSL. (***EXCEPTION****:* PTs may wear a parachute on drops above 14,000 feet MSL but will not position themselves near an open exit.) LPUs must be worn with parachutes for operations over bodies of water with the doors open.

19.33.4. If an oxygen console is used, the loadmaster will be stationed aft of it to perform inflight duties. The other loadmaster and physiology technician will be on interphone and normally forward of the oxygen console, if used, to perform inflight duties. This arrangement will provide a buddy system to check everyone on oxygen.

19.33.5. Maintain interphone contact between the cockpit and the cargo compartment. Both loadmasters must be on interphone from completion of pre-slowdown checks until execution of the completion of drop checklist and the cabin altitude is below 10,000 feet. The jumpmaster may also monitor interphone during high altitude personnel airdrops.

19.33.6. DZ requirements and markings are determined by the user. However, DZs must be established to ensure accurate navigation to the HARP. Positive visual or electronic (radar, TACAN, VOR/DME, ZM, etc.) identification of the HARP is required for high altitude drops.

19.34. High Altitude Personnel Airdrop Procedures.

CAUTION: Ensure any paratroopers remaining on-board de-arm their parachutes before cabin altitude descends below set parachute activation altitude.

19.34.1. Air deflectors must be operational if paratroop doors are used. If an air deflector does not extend, do not open the affected troop door.

NOTE: Jump platforms may be used.

WARNING: The aircraft ramp and door and paratroop door(s) will not be open at the same time.

19.34.2. When parachutists exit from the ramp, all parachutists, with the exception of the jumpmaster, will stand forward of the ramp hinge until the five-second advisory. One or both paratroop doors may be used in lieu of the cargo ramp. The ramp and door or paratroop door may remain open during racetracks if required, provided racetrack altitude is at or above a safe drop altitude and paratroopers are rigged for high altitude airdrops.

19.34.3. Minimum DZ criteria and markings will be determined IAW AFI 13-217. There are no altitude wind restrictions. For surface wind restrictions, refer to AFI 13-217.

19.34.4. For jumpmaster-directed HALO drops, the green light may be turned on one minute prior to the release point. The navigator will provide a standard "green light" call at the jointly agreed upon release point. User assumes responsibility for drop accuracy.

19.34.5. Normally, the jumpers will exit the aircraft at their own discretion; however, their exit must occur during the green light time.

19.35. High Altitude CDS. High altitude CDS drops are conducted when operationally or tactically more advantageous than low altitude operations. High altitude CDS containers are rigged with special parachutes and other equipment to reduce drift effect and total time of fall. Drop high altitude CDS using AWADS, GRADS, or radar beacon.

Section 19E—Airdrop Load Information

19.36. Personnel Airdrops.

19.36.1. In the event user personnel plan to jump with mixed parachute types, aircrews will always fly to and drop off the CARP for the main mass of paratroopers. The user assumes responsibility for the drop accuracy of individuals who choose to jump along with the main body of troopers while using a different type parachute. Aircrews will inform user jumpmasters if significant differences exist between CARPs.

19.36.2. Troop seats must have a serviceable retaining strap or be fitted with a pre-measured length of type III nylon cord to secure the seat in a raised position prior to slowdown. Ensure that parachutists have secured their seats, as required, and that no part of the seat protrudes into the aisle.

19.36.3. The loadmaster allows the jumpmaster access to the paratroop doors not later than the one minute advisory. (***EXCEPTION:*** The jumpmaster needs a minimum of two minutes in the door for jumpmaster directed drops.) The loadmaster then takes a position on the cargo ramp to provide maximum maneuverability for jumpmasters and safety personnel to perform their duties.

WARNING: During personnel airdrops, the loadmasters will not position themselves directly under the center anchor cable supports (A-Frame, FS 737) in case of anchor cable or support mounting failure.

NOTE: At no time will both paratroop doors be opened for paratroop drops if only one loadmaster is on board.

19.36.4. Upon seeing the red jump lights illuminate, the primary loadmaster will notify the jumpmaster or safety personnel of the red light condition. The loadmaster will count, if possible, any parachutists that exit while the red light is illuminated.

WARNING: Do not attempt to physically stop or hinder jumpers from exiting the aircraft if jumpers continue to exit after "red light".

19.36.4.1. Control of the paratroop doors reverts back to the loadmaster after all parachutists have exited or remaining parachutists have been stopped by the jumpmaster or safety personnel and cleared from the paratroop door area. For racetracks, the loadmaster will retain control of the doors until completing the next slowdown checks.

19.36.4.1.1. Racetrack speeds and flap settings are flown as briefed. The paratroop door(s) may be left open with jump platform(s) extended during racetracks if all paratroopers aft of the aft edge of the wheel-well (FS 617) are hooked up to the anchor cables. Jumpers may stand and hook up to the anchor cable with paratroop doors open provided they are forward of FS 617. Other occupants of the cargo compartment must either be seated with a seat belt fastened, wear a restraint harness, or wear a parachute.

19.36.4.1.2. Avoid flying over water or built up areas while doors are open.

19.36.5. Static line retrieval:

19.36.5.1. The primary method of retrieval is using the static line retriever. The static line retriever will always be rigged and used for emergency retrieval of a towed parachutist. Manual static-line retrieval may be used to retrieve no more than ten static lines per door, per pass with one loadmaster, or 20 static lines per door, per pass with two people (combination of loadmasters, jumpmasters or safety personnel).

NOTE: Jump platform(s) may be left extended during manual retrieval of static lines. However, if the retriever winch is used, the jump platform must be retracted.

NOTE: When using the Towed Parachutist Retrieval System (TPRS), paratroop door static lines are normally retrieved using the retrieval sling assembly (choker). The retriever assist strap (RAS) is not required for normal retrieval of static lines. Although not required, the RAS may be used for proficiency or instructional purposes during normal static line retrieval.

19.36.6. During combat, cut static lines that cannot be retrieved. On other than combat missions, if the static line retriever fails during retrieval and more than 10/20 static lines are to be retrieved from a paratroop door, manually retrieve the static lines by using a 5,000 pound tiedown strap as follows:

19.36.6.1. Secure the hook end to a point forward enough in the cargo compartment to permit static lines to enter completely in to the aircraft.

19.36.6.2. Insert the other end of the strap under the static line from the bottom up, making a "U" around the static lines.

19.36.6.3. Pull the strap forward to retrieve the static lines into the aircraft. Loadmasters may require assistance to pull the strap forward.

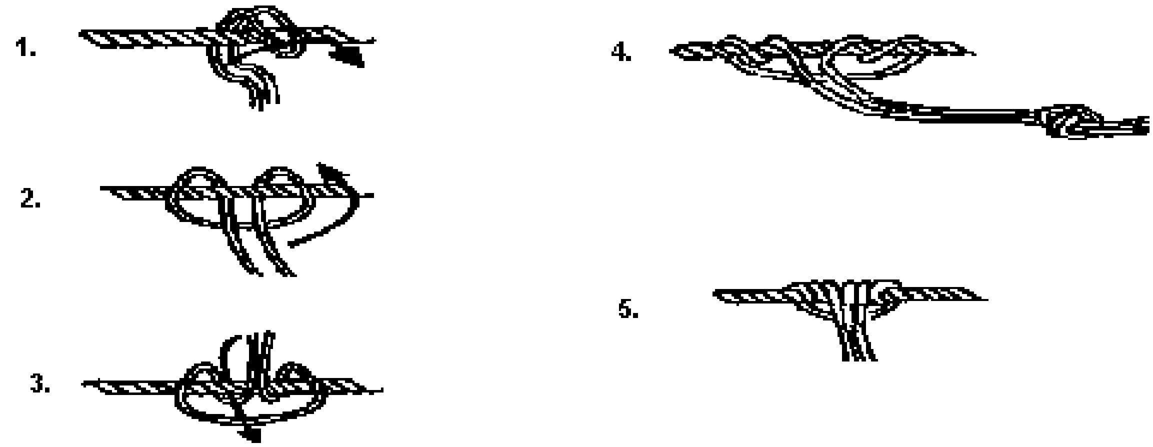
19.36.7. If the static line retriever fails following a combination or tailgate drop, use the following procedure using the Prusik knot.

19.36.7.1. Take a 30-inch piece of 1/2-inch tubular nylon cord that is tied in a loop. Loop the cord around the static line retriever winch cable as shown in **Figure 19.1.**. Use a minimum of three wraps around the retriever cable to ensure locking of the 1/2-inch tubular nylon cord.

19.36.7.2. Pull to tighten the knot around the retriever winch cable to prevent slipping. Attach a carabiner into the 1/2-inch tubular nylon loop. Attach the hook end of a 5,000-pound strap into the carabiner and pull in the static lines. The 1/2-inch tubular nylon cord will remain locked in place under tension.

19.36.7.3. More than one 1/2-inch tubular nylon cord may be attached to the winch cable using the Prusik knot to facilitate static-line retrieval. The Prusik knot may be adjusted up or down the cable as required. The knot will not slip as long as it is wrapped tightly with a minimum of three turns (more wraps equal more friction) and tension is applied.

Figure 19.1. Prusik Knot.



19.37. Tailgate Airdrop Procedures.

19.37.1. Tailgate drops are those drops during which parachutists exit from the aircraft ramp. The maximum rigged weight of the parachutist is 325 pounds. Tailgate drops are approved for STT, PJ, Air Force Survival Evasion Resistance Escape (SERE) Specialists, Army Special Forces, Navy SEALS, paratroopers equipped for arctic airdrop, other US and allied special operations personnel, US Army Quartermaster Center and School, Yuma Proving Ground Airborne Test Force, and units for which a combination drop is their normal method of deployment.

19.37.2. Rig both anchor cables and static line retrievers before takeoff to provide maximum mission flexibility. Mission commanders may approve rigging only one cable and static line retriever winch if circumstances dictate.

19.37.3. Use one anchor cable for each pass and limit each pass to a maximum of 20 parachutists. If more than one pass is required, alternate anchor cables, retrieving static lines and deployment bags prior to each additional pass to prevent entanglement. Static lines are retrieved using aft controls.

NOTE: To ensure full utilization of the aircraft during training, over-the-ramp personnel airdrops may be made with center-aisle seats installed to approximately flight station 650 (aft of escape ladder). When more than 20 static line parachutists are to be dropped on a single pass, the paratroop doors will be used.

19.38. Combination Airdrops.

19.38.1. Combination drops are those during which parachutists exit from the aircraft ramp after equipment extraction or gravity release (CDS, Combat Rubber Raiding Craft (CRRC), Container Ramp Bundle etc.).

NOTE: The M551 armored reconnaissance and airborne assault vehicle (ARAAV) and its crew may be airdropped as a combination drop provided the M551 is rigged on a type V airdrop platform. The M551 crew will hook their static lines to the right anchor cable.

19.38.2. Combination drops are restricted to single-ship or the last aircraft of an equipment formation. When tailgating parachutists, the drop altitude is determined by the item requiring the highest drop altitude per AFI 11-231. If an additional pass is required to drop all the personnel after a combination CDS drop, close the ramp and door and re-rig the static-line retriever cable as depicted in T.O. 1C-130A-9.

19.38.3. The navigator will compute a CDS or platform CARP and a personnel CARP (for ten seconds after the equipment release point) using the same indicated airspeed (IAS) and altitude used for the equipment. Inform the jumpmaster if the PI falls within 150 yards of the DZ boundary; the jumpmaster is the final approving authority in this situation.

19.39. Door Bundle Airdrops.

19.39.1. General A-7A or A-21 containers weighing up to 500 pounds (excluding the weight of the parachutes) are referred to as "door bundles" and are dropped from the aircraft through the paratroop door or ramp and door using the personnel airdrop checklist. Door bundles may be dropped independently or with personnel and are limited to one bundle per exit used. When dropped with personnel, the bundle is the first object to exit the aircraft. Remove restraints and position the bundle in the paratroop door or on the ramp prior to completion of the slowdown checklist. (***EXCEPTION:*** If the jumpmaster needs the paratroop door for spotting, place the door bundle as close as possible to the paratroop door.) If jumpers are to follow the door bundle, the user is responsible for ejecting the bundle out the troop door or off the ramp. For door bundles exiting over the ramp, secure the forward end of the bundle to a suitable floor tiedown ring with one-half inch tubular nylon. This tie is to prevent premature release of the bundle and will be cut by the loadmaster at the release point.

19.39.1.1. Door bundles dropped from the paratroop doors will be rigged with non-breakaway static lines. Their dimensions, including the parachute, must not exceed 48 inches by 30 inches by 66 inches unless authorized in a specific T.O. When the container is placed in the door for airdrop, place the largest dimension in the vertical or upright position.

19.39.1.2. Door bundles dropped from the ramp and door will be rigged with a T-10 parachute (converted for cargo) or parachute equipped with breakaway static lines (per TO 13C7-1-11). Also, bundles rigged for a ramp exit are equipped with a skid board compatible with the center roller conveyors.

NOTE: If no parachutists are to be dropped after the door bundles, non-breakaway static lines will be used. Anchor cable stops will be positioned as depicted in TO 1C-130A-9 for CDS airdrops.

19.39.2. During unilateral single-ship airdrop training, door bundles will not exit aircraft after a paratrooper has jumped.

NOTE: During joint training, combat or contingency operations, the user determines door bundle requirements and order of exit from any or all personnel airdrop aircraft in the formation.

19.39.3. When door bundles are dropped with personnel, compute the CARP for the first paratrooper exiting after the bundle and compute an additional CARP for the door bundle to ensure that it will impact on the DZ. Release the bundle at the personnel CARP, followed by the parachutists when the door is clear. When a door bundle is the only object dropped, base the CARP on the bundle.

19.40. Equipment Airdrops. Only equipment rigged in accordance with 13-C series T.O.s or JSOC 350 series may be airdropped. The maximum airdrop load to be extracted over the ramp is 42,000 pounds for C-130E/H airplanes 61-2358, 62-1784 and up and 25,000 pounds for other C-130 aircraft. The aerial delivery unit supporting the load movement ensures current publications are available for loadmaster reference during joint inspections.

19.41. CDS Airdrops. The CDS is designed to airdrop single or double A-22 type containers. Single A-22 type containers may be rigged for low velocity or high velocity airdrops. Double A-22 type containers are normally rigged for low velocity airdrops only. The weight of each container will be IAW TO 13 C7-1-11/FM 10-501.

19.41.1. Reset flaps according to the appropriate CDS flap setting chart and maintain level flight. (See the abbreviated checklist for CDS flap setting chart.) Flap settings are based on aircraft gross weight, number of bundles, and airspeed. Correct settings provide an approximate 6- to 8-degree nose high attitude to allow gravity to extract the CDS bundle. A stable deck angle is critical at green light to reduce the possibility of a slow load exit, particularly when using the CVR. Drop at 140 knots when feasible since a faster drop speed is a more tactically sound procedure. It is not recommended to drop CDS at gross weights less than 104,000 pounds. If drop must be made, use zero flaps and expect longer than normal exit time. The CDS exit may be accelerated by adding power and initiating a climb. This technique is recommended for contingency and combat situations as a last resort, but is not recommended for training situations.

CAUTION: The aircraft will tend to pitch up as the load exits the aircraft. This pitch must be controlled to allow no more than two or three degrees additional pitch. Do not over control to the point that negative "G" forces are encountered while the load is exiting the aircraft as this increases exit time or may stop load movement.

CAUTION: Dropping high altitude CDS bundles at 17,000 feet or above requires proper yoke compensation for shift in center of gravity as the load exits. Premature yoke inputs, over compensation, or no yoke inputs all may result in aircraft tail impacts by exiting bundles.

19.41.2. When the loadmaster calls “load clear”, the flaps should be set to 50 percent.

19.41.3. When authorized by the OG/CC or DIRMOBFOR, a manual gate cut may be performed if the static-line retriever fails to cut the gate at "green light." Manual gate cuts are accomplished by the loadmaster pulling sharply on a tiedown strap looped over the static line retriever winch cable.

19.42. CRRC Airdrops.

19.42.1. The CRRC is employed in a variety of missions: unconventional warfare, special warfare, and amphibious operations. CRRCs are released using the standard CDS checklist. Either two CRRC platforms and up to 18 static-line parachutists or one CRRC platform and up to 19 parachutists may be airdropped on one pass. Checklist and emergency procedures are the same as for CDS airdrops. Wind and sea state limitations are at the discretion of the supported unit.

NOTE: When airdropping two CRRC platforms, the forward release gate must be cut manually by the loadmaster.

19.42.2. Two CRRC platforms along with parachutists may be dropped in a single pass during night operations without NVG-qualified loadmasters provided the following conditions are met:

19.42.2.1. The inserted unit will provide a NVG-qualified jumpmaster who will be a nonjumping member.

19.42.2.2. Cargo compartment lighting will be configured with centerline lights white and dim, and, outboard lights off throughout the drop. In the event a parachutist is towed, all white lights may be turned on.

19.42.2.3. Nonjumping, NVG-qualified jumpmasters, will wear Air Force provided parachutes and will position themselves in the troop door on the opposite side of the aircraft of the anchor cable to which the CRRC and parachutist's static lines are attached. They will not go aft of the ramp hinge or in the intended path of the second CRRC platform during drop operations.

19.42.2.4. During the drop phase, the NVG-qualified jumpmaster will ensure parachutists of the first CRRC have cleared the aircraft before signaling the loadmaster to cut the release gate for the second CRRC.

19.42.2.5. The NVG-qualified jumpmaster will be present for the pilot, jumpmaster, and loadmaster briefing. Coordinate signals to indicate clearance to drop the second CRRC and towed parachutist signals.

19.43. Free-Fall Airdrops. Certain supplies, equipment containers, or weapons can be airdropped without parachutes. The pallets, skid boards, or containers used depend on load composition. Normally, skid boards are rigged for standard CDS delivery. The terrain, wind, load being dropped, user requirements, and the tactical situation determine drop altitude. Compute free-fall release points using procedures in AFI 11-231. Use the normal CDS airdrop checklist and emergency procedures. Single containers not exceeding weight or dimension restrictions for door bundles may be dropped from either troop door using the personnel airdrop checklist.

19.44. High Velocity CDS Airdrops. High velocity CDS airdrops use specially-rigged containers equipped with energy dissipating material under them and a stabilizing device, such as a 22-foot ring slot extraction parachute, a 26-foot ring slot parachute, or small 68-inch pilot parachute. (High velocity CDS must be rigged with breakaway static lines.) Use normal CDS aircrew checklist procedures. Navigators compute the high velocity CDS CARP/HARP according to AFI 11-231).

19.44.1. The following guidance is provided for unilateral training CDS airdrops:

19.44.1.1. Non-Breakaway: All high-velocity unilateral training CDS loads dropped at 9,999 feet MSL or below will be rigged and airdropped with non-breakaway static lines.

19.44.1.2. Breakaway: All high velocity unilateral training CDS loads dropped at 10,000 feet MSL and above will be rigged and airdropped with breakaway static lines. EXCEPTION: A drop altitude of 5,000 feet AGL must be maintained. If the drop altitude is not 5,000 feet AGL, the loads must be rigged with a non-breakaway static line.

19.44.1.3. Units must establish a marking system to readily identify which 26-foot parachutes are packed for breakaway and non-breakaway static lines. The aircrew must ensure the CDS loads and the high-velocity parachutes are rigged and packed (marked) properly for the planned airdrop altitude (MSL), and drop zone to aircraft altitude separation (AGL). Aircrew procedures must be consistent with parachute packing.

19.45. Container Ramp Bundles. Ramp bundles are those items with specific rigging procedures intended for release from the aircraft ramp. Ramp bundles are not door bundles rigged in A-7A or A-21 containers, CRRCs, or standard A-22/23 containers compatible with the aircraft CDS. The CDS Airdrop

Checklist will be used with the exception of arming the CDS switch. CDS flap setting must be computed and used to ensure a positive deck angle for the drop.

19.45.1. Current items considered ramp bundles are: Zodiac Boat in A-22 Cargo Bag (RAMZ) rigged IAW FM 10-542/TO 13C7-51-21, Small Inflatable Boat (IBS) rigged IAW FM 10-542/TO 13C7-51-21, and One or Two Motorcycles on a Combat Expandable Platform rigged IAW FM 10-577/TO 13C7-55-1. Ramp bundles will loaded and rigged in the aircraft IAW Section 7C of the aircraft Dash 9. The following information addresses RAMZ but may apply to all container ramp bundles:

19.45.1.1. The RAMZ is an inflatable boat rigged in an A-22 container using two, modified T-10B parachutes. It is dropped in combination with PJs who may exit the aircraft immediately after the container is released or on a subsequent pass, depending on the type parachute used by the PJs. Following the drop, PJs derig and inflate the boat to provide a vessel to aid in water rescue and recovery operations. Mission scenario may require multiple deliveries of RAMZs and PJ teams to different drop sites. Refer to T.O. 1C-130A-9, section 7C, for rigging procedures. Specific deployment is as follows:

19.45.1.2. RAMZ containers are jumpmaster-directed ramp bundle drops regardless of the type parachute used by the PJ team. (For navigator directed procedures, see paragraph **19.45.2.3.2.**) The jumpmaster may use streamers and request additional passes to position the aircraft over the containers and PJs release point. Containers are individually secured to the ramp with Type VIII nylon, which is manually cut by the loadmaster on the jumpmaster's command. PJs may exit immediately after container release or on a subsequent pass.

19.45.2. Run-ins for RAMZ airdrops are typically planned and flown into the wind, tactical situation permitting.

19.45.2.1. For jumpmaster-directed RAMZ airdrops, a navigator's CARP/HARP is not required when using streamers/spotter chutes.

19.45.2.2. For single-pass RAMZ airdrops, compute the CARP/HARP for the RAMZ by dividing the packages weight in two and applying this result to the ballistic data for a single, personnel T-10A/B parachute. If pararescue personnel jump on the same pass with the RAMZ, paragraph **19.38.** combination drop procedures apply.

19.45.2.3. Alternate Navigator Directed RAMZ Deployment.

19.45.2.3.1. Accomplish the slowdown using normal procedures.

19.45.2.3.2. Release point. The navigator determines the release point and assumes the responsibility to call "five seconds" and "green light." In lieu of a CARP/HARP, compute the release point in the following manner: First, determine the ballistic wind; second, for a 3,500 feet drop altitude, fly one second past the objective for each knot of ballistic wind before release, for lower drop altitudes adjust the timing. Example: Ballistic wind from surface to 3,500 feet is 240/13 knots; first, fly over the objective on a 240 degree heading; second, abeam the objective begin timing; third, after 8 seconds call "five seconds", after 13 seconds call "green light." The lack of consideration for forward travel distance establishes the safety zone. At green light, the loadmaster will manually cut the RAMZ bundle loose, which will signal the jumpers are clear to follow the gravity ejected load.

19.45.3. RAMZ Preflight. Prior to flight, the loadmaster will ensure the following items are accomplished:

19.45.3.1. Ensure that no fuel is leaking from the RAMZ bundle. A leaking bundle will not be loaded aboard the aircraft or will be downloaded if already aboard. The fuel bladders have a tendency to emit fumes. If one or more RAMZ are loaded aboard the aircraft the day prior to flight, there will probably be fumes in the aircraft the following day. The fumes may be decreased/eliminated by venting the aircraft overnight. Close both paratroop doors onto the extended jump platforms and secure them with tie down straps. If the RAMZ is emitting fumes and the aircraft must temporarily remain pressurized, taping the urinal covers open may reduce or eliminate the fumes.

WARNING: If flammable fumes are present, unnecessary electrical equipment/switches will not be turned on or off until the fumes are eliminated. Use 100 percent oxygen and accomplish the Smoke and Fume Elimination checklist as appropriate.

WARNING: Only 15-foot static line will be used on the RAMZ cargo parachutes. A 12-foot static line extended to 15-feet will not be used. If personnel (rigged for static line airdrop) are to follow immediately after the RAMZ, their static lines will also be 15-feet.

NOTE: When loaded aboard the aircraft, the vertical restraint tiedown strap on the RAMZ will be secured in such a manner that it is not placed over any fuel bladder, and just tight enough to take the slack out of the strap.

19.45.4. RAMZ Deployment:

19.45.4.1. During the pre-slowdown checklist, vertical, aft and forward restraint straps will be removed from the RAMZ package. Gradually release the forward restraint to allow the package to slowly shift forward against the Type VIII nylon release strap.

WARNING: Personnel must stand clear of the RAMZ package when removing the forward restraint.

19.45.4.2. At the "one minute" call, the jumpmaster will normally be on the left side of the cargo ramp and may be spotting from the aft end. Additional jumpers will be forward of the RAMZ. The loadmaster will be positioned to retrieve the RAMZ parachute static line D-bag(s) (for HALO airdrops) and to observe equipment and jumpers at all times. At the "one minute" call, the jumpmaster will be alerted and the Type VIII nylon release strap is rechecked.

WARNING: If a "no drop" is called and the RAMZ is held in place by only the release strap, all personnel will move forward of the ramp hinge, except the loadmaster and the jumpmaster who will monitor the RAMZ for possible shifting and secure as necessary.

19.45.4.3. If the deployment is jumpmaster directed, the jumpmaster will determine the exit point and deploy prior to receiving a "no drop" notification or seeing the red light come on. The loadmaster will relay to the pilot all visual corrections given by the jumpmaster. The jumpmaster will signal for the loadmaster to cut the Type VIII nylon release strap.

19.45.4.4. If the deployment is pilot or navigator directed, the loadmaster will relay pertinent information to the jumpmaster. At the command "green light", the loadmaster will cut the Type VIII nylon release gate and deploy the RAMZ. If jumpers are tailgating, this will signal the jumpers that they are cleared to follow the load. If jumpers are freefall parachuting, they will exit after the loadmaster has retrieved the RAMZ parachute D-bags.

WARNING: If the RAMZ exits the aircraft, but fails to properly deploy, the static lines will be cut immediately.

CAUTION: The Type VIII nylon release strap must be cut below the knot to allow the nylon strap to pull free through floor tie down rings.

19.45.5. The RAMZ package will normally be delivered aligned into the wind (+/- 30 degrees) when the wind is 5 knots or greater. The jumpmaster will be advised when this cannot be complied with. The surface wind limitation for training is 22 knots and a sea state of 4. Limitations for operational use will be determined by the aircraft commander.

19.45.6. The minimum deployment altitude will be 3500 feet AGL when the PJs exit using freefall parachutes. Higher altitudes may be used for training. For operational missions, minimum altitude with the freefall parachutes is 2500 feet AGL. If low ceilings prohibit the use of freefall parachutes, the PJs will deploy using static line parachutes immediately following the RAMZ package. The RAMZ and PJs will be deployed from the same altitude. The minimum deployment altitude for both RAMZ and PJs will be 800 feet AGL.

19.45.7. For training, one or more safety recovery boats will be in position to recover equipment and personnel as required.

19.46. SATBs. A 15-pound training bundle may be dropped to simulate personnel, equipment, or CDS airdrops. Use the applicable tactical airdrop checklist for the type airdrop being simulated. (EXCEPTION: The loadmaster will use the equipment checklist for simulated CDS airdrops.) Specific rigging and inspection procedures are in Volume 3, abbreviated checklist, and TO 13C7-1-11. SATBs may be dropped on the actual heavy equipment or CDS CARP for sight angle airdrop training provided the bundle will land on the DZ. Adjust the drop score for the difference between the SATB CARP and the actual CARP.

Section 19F—Emergency Procedures

19.47. General. If a malfunction occurs during an airdrop, the loadmaster immediately notifies the pilot and takes appropriate action. After all appropriate emergency actions are complete, run the completion of drop checklist. All crewmembers should review the applicable emergency procedures for the airdrop to be performed before takeoff. Detailed emergency briefings will be conducted between the loadmasters.

19.48. Emergency Parachutist Bail Out Procedures.

19.48.1. Under satisfactory conditions (static-line exit), the minimum acceptable emergency bailout altitude is 400 feet above the terrain. When an aircraft emergency occurs during static-line airdrops, the pilot maintains an acceptable attitude and altitude for the parachutists to evacuate the aircraft. If the jump must be made at an airspeed in excess of 150 KIAS, advise the parachutists of the airspeed and altitude. Order evacuation by turning on the green light and giving the briefed alarm bell signals.

19.48.2. Minimum emergency bail-out altitude for free-fall parachutists is 2,000 feet AGL.

19.48.3. If conditions are unsuitable for aircraft evacuation, turn the red light on until exit doors are closed. The AC advises the jumpmaster through the loadmaster to have the parachutists unhook, take their seats, and fasten seatbelts.

19.49. Towed Parachutist.

19.49.1. The jumpmaster will stop the remaining parachutists; the loadmaster will notify the pilot; and the copilot will turn on the red light. The pilot will maintain drop airspeed, at least the minimum drop altitude (AGL) for the type parachute being used, and avoid flying over or up wind of water or built up areas.

19.49.1.1. Crews should suspect they have a towed parachutist if static lines are not fully tucked into the upper corner of the paratroop door or if a D-bag appears to be stuck outside the door. It is unlikely for a D-bag to become caught on the outside of the aircraft and is a probable indicator a parachutist is being towed. In any case, crews should follow emergency procedures until they have confirmed no parachutist is being towed. Crews should take special effort to confirm towed jumper status at night with limited rearward visibility. They should consider using an additional source of illumination to view the rear of the aircraft.

19.49.2. The jumpmaster or safety observer is responsible for identifying how the parachutist is towed. If being towed by anything other than the static line, the jumpmaster or safety will attempt to free the parachutist. If being towed by the static line, the jumpmaster or safety will make a recommendation to the AC, through the loadmaster, whether to retrieve the parachutist or cut him or her free. If all parachutists have exited and there is no safety person onboard, this responsibility rests with the loadmaster.

19.49.3. The AC will make the final decision whether or not to cut the towed parachutist free. If the decision is to cut the parachutist free, the loadmaster will cut the static line on the AC's command.

NOTE: Towed parachutists indicate consciousness and that reserve parachute is ready by maintaining a tight-body position with both hands on reserve parachute. This indicates the jumper is prepared to be cut away.

19.49.4. If the parachutist is towed after exit from a paratroop door, the pilot should lower the landing gear and set flaps to 100 percent to reduce parachute buffeting. (See warning below.) If possible, avoid turning the aircraft in the direction of the towed parachutist as this often causes parachutist to swing violently and increases the possibility of injury. All turns should be shallow and coordinated to reduce the severity of parachutist oscillation. During training, the first priority is to retrieve the parachutist whether he or she is conscious or unconscious. However, if the parachutist cannot be retrieved and indicates consciousness, cut the parachutist free.

WARNING: Although 100 percent flaps selection provides an improved airflow for a towed parachutist, under certain conditions the landing gear down, 100 percent flap configuration may reduce aircraft performance. The AC should consider density altitude, aircraft weight, position in formation, or other factors deemed important in determining what flap setting between 50 and 100 percent should be used.

19.49.5. For a parachutist towed after exit from the cargo ramp and door, the first priority is to cut the parachutist free if consciousness is indicated. Retrieve if the parachutist is unconscious, does not signal, cannot be observed, or if a condition exists that prevents cutting the static line.

NOTE: If the parachutist is towed following a ramp exit, it will be necessary to partially rewind the static-line retriever to reach the static line for cutting.

19.49.6. There are two methods for the retrieval of towed parachutists from the paratroop doors. The primary method of retrieval is use of the Towed Parachutist Retrieval System (TPRS). The secondary method of retrieval is to rig a 5,000-pound tiedown strap/paratroop retriever bar in the paratroop door prior to retrieval of the towed parachutist. When the secondary method must be used, the maximum rigged weight of the parachutist is limited to 250 pounds (including equipment, parachute, etc.)

WARNING: The 5,000-pound tiedown strap/paratroop retriever bar shall not be used with the TPRS.

19.49.7. Parachutist Retrieval Through Paratroop Door Using TPRS.

19.49.7.1. Install the retrieval sling assembly (choker) around all static lines immediately below the static line snap hooks.

19.49.7.2. Install Retriever Assist Strap (RAS) around all static lines.

19.49.7.3. Fold in jump platform.

19.49.7.4. Using the static line retriever winch, retrieve the static lines through the RAS.

19.49.7.4.1. If the static line retriever winch has been modified with the slip clutch assembly, engage static line retriever winch until it slips. If the retriever clutch slips prior to bringing the parachutist into the paratroop door area, determine and remove the cause of the overload, slightly unwind the static line retriever winch to reset the slip clutch, and continue retrieval operation.

WARNING: During retrieval attempts, take all possible action to ensure the parachutist does not slip back at any time. This does not preclude unwinding the retriever to reset the slip clutch, if necessary.

19.49.7.4.2. Stop retrieval when the cotton sleeve at the apex of the D-bags begin to pass through the RAS.

19.49.7.5. If in the paratroop door area, bring the parachutist into the aircraft by hand. If the parachutist is not in the paratroop door, i.e. positioned in the lower aft corner of the paratroop door, it is necessary to pull the D-bags manually through the RAS. Primary loadmaster maintains control of the static line retriever pistol grip. Secondary loadmaster and safety observer or jumpmaster (if safety observer or jumpmaster are onboard the aircraft) routes the D-bags through the RAS. Once the D-bags have been brought into the aircraft, manually pull them far enough forward so they will not interfere with the remaining retrieval. The primary loadmaster will continue retrieval. When pulled up to the door, bring the parachutist into the aircraft by hand.

WARNING: All personnel should remain clear of the paratroop door and the line of travel of the static line retriever cable until the parachutist has been retrieved to the door area.

NOTE: When the parachutist is in the door area and is under the control of the loadmaster or safety observer, or jumpmaster, slightly unwind the static line retriever to relieve tension on the line so the parachutist can be brought into the aircraft.

19.49.7.6. After retrieving the parachutist, the pilot will reset flaps to 50 percent, raise the landing gear (if required), and call for completion of drop checklist.

19.49.8. Parachutist Retrieval Through Paratroop Door Using 5,000-Pound Strap/Paratroop Retriever Bar.

19.49.8.1. Install a 5,000-pound tiedown strap across the paratroop door by threading the hook end of the strap behind the one inch tubular brace located at FS 737, across the door under all static lines, and behind the one inch tubular brace at FS 700. Secure the hook end of the tiedown strap to a floor/rail tiedown ring forward of FS 700 and the ratchet end to any convenient tiedown ring aft of FS 737. Remove as much slack as possible.

WARNING: Use extreme caution when routing 5,000-pound strap over the oxygen regulators located at FS 740 left and right side.

NOTE: The strap may be routed prior to the drop at FS 740 provided it is secured and does not interfere with the paratroop door operation or jumpers.

19.49.8.2. Push the static lines to the top of the paratroop door and remove additional slack in the tiedown strap. Fold the jump platform in.

19.49.8.3. If the airplane is equipped with a paratrooper retriever bar, install the bar as follows: The bar is inserted beneath all of the static lines extending out of the door, and one end is then raised and inserted in the retaining bracket in the aft portion of the door frame. The other end of the bar is then carefully raised and inserted in the forward portion of the door frame. The bar provides a smooth surface for the static lines to ride over as the paratrooper is retrieved back into the airplane.

19.49.8.4. Fold the jump platform in and initiate retrieval using the static-line retriever winch.

19.49.8.4.1. If the aircraft has been modified with the slip clutch assembly to the static-line retriever winch, engage static-line retriever until it slips. If the retriever clutch slips prior to bringing the parachutist into the paratroop door area, determine and remove the cause of the overload. Then, slightly unwind the retriever to reset the retriever's slip clutch, and continue retriever operation.

19.49.8.4.2. On aircraft not modified with slip clutch assemblies, stop retrieval when the cotton sleeve at the apex of the D-bags begins to pass over the 5,000-pound strap/paratroop retriever bar.

WARNING: During retrieval attempts, take all possible action to ensure the parachutist does not slip back at any time. This does not preclude unwinding the retriever to reset the slip clutch, if necessary.

19.49.8.5. When the parachutist is in the paratroop door area, bring the parachutist into the aircraft by hand. If it is difficult to get the parachutist into the area of the paratroop door, i.e. positioned in the lower aft corner of the paratroop door, it will be necessary to pull the D-bags manually through the opening between the 5,000-pound strap/paratroop retriever bar and the paratroop door.

19.49.8.5.1. The loadmaster maintains control of the static line retriever pistol grip. The other loadmaster, safety observer or jumpmaster will route D-bags through the opening. Once D-bags have been brought into the aircraft, manually pull them far enough forward so they will not interfere with the remaining retrieval.

19.49.8.5.2. The loadmaster will continue retrieval. When pulled up to the door, bring the parachutist into the aircraft by hand.

WARNING: All personnel should remain clear of the paratroop door and line of travel of the static-line retriever cable until the parachutist has been retrieved to the door area.

NOTE: When the parachutist is in the door area and is being controlled by the loadmaster, safety observer or jumpmaster, slightly unwind the static-line retriever to relieve tension on the line so the parachutist may be brought into the aircraft. The jump platform may be extended once the parachutist is in the door area.

19.49.8.6. After retrieving the parachutist, the pilot will reset flaps to 50 percent, raise the landing gear (if required) and call for the completion of drop checklist.

19.49.9. Parachutist Retrieval Through Ramp and Door.

WARNING: The TPRS shall not be used during parachutist retrieval through ramp and door.

19.49.9.1. Thread the hook end of the 5,000-pound tiedown strap, front to rear, around the right/left vertical support member at FS 840 approximately 5-1/2 feet above the ramp in the ADS position. Attach the hook end into the strap and draw taut. Run the ratchet end of the strap across the ramp and thread it, front to rear, around the opposite vertical support member at FS 840. Remove all slack from the strap and attach the ratchet end to any convenient tiedown ring forward of FS 840. Ratchet the strap until taut.

NOTE: For aircraft with tiedown rings installed at FS 847 (waterline 208), the 5,000-pound tiedown strap may be installed by attaching the hook end of the strap to the sidewall ring at FS 847 on the same side as the towed parachutist with the hook facing forward. Hook the ratchet end of the strap to the opposite sidewall ring at FS 847, remove all the slack from the strap, and ratchet the strap until taut. The strap will be pre-measured prior to pre-slowdown and excess strap taped.

19.49.9.2. Using the static-line retriever, retrieve the static lines over the strap and as the parachutist is pulled up to the ramp, bring the parachutist into the aircraft by hand underneath the strap.

WARNING: The last 5 feet are the most crucial for the towed parachutist. An oscillating parachutist usually strikes the aircraft head first. If the parachutist is oscillating violently, stop the retrieval momentarily to allow stabilization, then continue with retrieval. Repeat these steps as required.

NOTE: After the parachutist is pulled up to the ramp and is being controlled by the jumpmaster, safety observer or loadmaster, slightly unwind the static-line retriever to relieve tension on the line so the parachutist can be brought into the aircraft.

19.49.9.3. After retrieving the parachutist, run the completion of drop checklist.

WARNING: There is no effective, dependable, nor consistently reliable means to manually retrieve a towed parachutist from the paratroop door or ramp and door. Manually retrieving a parachutist is a last resort. Manual retrieval techniques vary, depending on the scenario, and should be used with extreme caution.

19.50. Equipment Emergency Procedures.

19.50.1. When notified of a malfunction, the pilot will maintain drop airspeed and AGL altitude (if possible) and avoid flying over or upwind of water or built up areas to the maximum extent possible. The loadmaster will accomplish the malfunction checklist and notify the pilot when complete. The crew will then run the completion of drop checklist.

WARNING: Do not proceed aft of any platform or load until it is properly restrained. Preposition emergency aft restraint chains. Attach restraint to the items to which the extraction force is applied and remove all slack. Required restraint is per TO 1C-130A-9.

NOTE: Upon landing, ensure the load and airdrop system is not tampered with until after the malfunction is investigated by tactics/standardization and evaluation personnel.

19.50.2. Loose platform prior to green light. The loadmaster will take the following corrective actions:

19.50.2.1. Notify the pilot by stating “Malfunction, loose platform”.

19.50.2.2. Alert parachutists (if required) to remain forward/clear of the load.

19.50.2.3. Apply emergency restraint chains on all platforms to be dropped, moving from front to rear.

19.50.2.4. Raise the aft anchor cable supports, if required.

19.50.2.5. Clear the ramp and door to close.

19.50.2.6. Relock the platforms.

19.50.2.7. Secure the platform(s) with aircraft tiedown equipment if unable to engage the locks.

19.50.2.8. After completing the malfunction checklist, perform the completion of airdrop checklist.

NOTE: Make no further attempt to airdrop the platform.

19.50.3. Extraction parachute fails to release mechanically/falls on the ramp. The loadmaster will:

19.50.3.1. Notify the pilot by stating “Malfunction” with a brief description of the problem.

19.50.3.2. Alert parachutists (if required) to remain forward/clear of the load.

19.50.3.3. Apply emergency aft restraint chains on all platforms moving from front to rear.

19.50.3.4. Raise aft anchor cable supports, if required.

19.50.3.5. Clear the ramp and door to close.

19.50.3.6. Relock the platforms.

19.50.3.7. Secure the platform(s) with aircraft tiedown equipment if unable to engage the locks.

19.50.3.8. After completing the malfunction checklist, perform the completion of airdrop checklist.

NOTE: Make no further attempt to airdrop the platform.

19.50.4. Load fails to extract with a single extraction parachute outside the aircraft. The loadmaster will:

19.50.4.1. Notify the pilot by stating “Malfunction”, with a brief description of the problem.

19.50.4.2. Alert parachutists (if required) to remain forward/clear of the load.

19.50.4.3. Apply emergency restraint chains to all platforms moving from front to rear.

19.50.4.4. Cut the extraction line.

19.50.4.5. Raise the aft anchor cable supports, if required.

19.50.4.6. Clear the ramp and door to close.

19.50.4.7. Relock the platforms.

19.50.4.8. Secure platform(s) with aircraft tiedown equipment if unable to engage the locks.

19.50.4.9. After completing the malfunction checklist, perform the completion of airdrop checklist.

NOTE: Make no further attempt to airdrop the platform.

WARNING: Ensure the lifeline is attached and locked to a tiedown ring no further aft than FS 677 prior to proceeding aft to cut the extraction line.

WARNING: Exercise caution when cutting the extraction line because of possible line recoil.

WARNING: The combined effects of aircraft gross weight, drop altitude, and temperature may prevent level flight at drop speed when towing deployed extraction parachutes as small as 22 feet. Total drag on the aircraft may be more than the thrust available to overcome it. The situation could require an immediate forced landing near the DZ.

19.50.5. Multiple 28 foot extraction parachutes fail to release mechanically/fall on the ramp. The loadmaster will:

19.50.5.1. Notify the pilot by stating "Malfunction" with a brief description of the problem.

19.50.5.2. Alert parachutists (if required) to remain forward/clear of the load.

19.50.5.3. Raise aft anchor cable supports , if required.

19.50.5.4. Clear the ramp and door to close.

19.50.5.5. Relock the platforms.

19.50.5.6. Secure the platform(s) with aircraft tiedown equipment if unable to engage the locks.

19.50.5.7. After completing the malfunction checklist, perform the completion of airdrop checklist.

NOTE: Make no further attempt to airdrop the platform.

19.50.6. Load fails to extract with multiple 28-foot extraction parachutes outside the aircraft. The loadmaster will:

19.50.6.1. Ensure the right rail control handle is in the emergency position.

19.50.6.2. Notify the pilot by stating "Malfunction, load failed to extract" (if the load still fails to extract).

19.50.6.3. Alert parachutists (if required) to remain forward/clear of the load.

19.50.6.4. Pull the simul open control handle full forward.

WARNING: The loadmaster must apply a sustained steady pull (10-20 seconds) on the simul open control handle to compensate for lock loading and binding caused by the towed parachutes.

19.50.6.5. Report the condition to the AC if the load still fails to extract.

19.50.7. If the load cannot be jettisoned and flight conditions permit, proceed to a suitable airfield, avoid flying over built up areas and land in a flat attitude with ramp and door open.

WARNING: With multiple 28-foot extraction parachutes deployed outside the aircraft, maximum thrust will be needed to stay aloft or to control the descent. The drag produced by the extraction parachutes should decrease if airspeed is allowed to bleed off. This reduction in drag could permit level flight or reduce the rate of descent should level flight not be possible. Do not reduce power to achieve this airspeed change and do not slow below max effort takeoff speed. Max effort takeoff speed is 1.2 X power on stall speed and provides an acceptable airspeed margin for zero bank angle. If the aircraft must be turned to get to a suitable landing area, this airspeed may not be sufficient to prevent a stall while in banked flight. If a turn is required, pilots should be sensitive to the first indication of a stall and reduce bank and or lower nose to decrease angle of attack and eliminate the stall indication. Any power reduction will increase the stall speed. The tradeoff in selecting a landing site, straight ahead or one requiring a turn is a function of the rate of descent the required airspeed will produce. The higher the airspeed, the faster the aircraft will likely descend. A forced landing straight ahead will produce the lowest allowable airspeed, least rate of descent and most desirable impact forces. Any turn will decrease the time before impact. However, the risks associated with turning may be mitigated by the terrain the aircraft will impact such as forest or built up areas.

19.51. CDS Emergency Procedures.

19.51.1. Gate fails to cut/load fails to exit.

19.51.2. The loadmaster will take the following corrective actions:

19.51.2.1. Dearm the CDS switch (if installed).

19.51.2.2. Notify the pilot by stating “Malfunction” with a brief description of the problem.

19.51.2.3. Alert parachutists (if required) to remain forward/clear of the load.

19.51.2.4. Raise the aft anchor cable supports (if required).

19.51.2.5. Clear the ramp and door to close.

WARNING: When notified of a malfunction, extend additional flaps and lower the nose to maintain a slight nose down attitude until the ramp and door are closed and the load is secured. Maintain drop airspeed and AGL altitude (if possible) and avoid flying over or upwind of water or built up areas.

WARNING: When dropping double stick using the CVR and one gate fails to cut, the loadmaster will delay notifying the pilot of a malfunction until the containers of the released stick have exited the aircraft. If the containers of both sticks fail to exit, notify the pilot immediately and continue with emergency procedures.

WARNING: When the cargo ramp and door cannot be closed from the cockpit, the loadmaster secures the load for aft movement. Ensure the lifeline is locked to a tiedown ring no further aft than FS 677 prior to proceeding aft to operate the cargo ramp and door controls.

CAUTION: If the load is jammed in the ramp area, notify the engineer to stop closing action when the cargo door releases from the uplock. If this is necessary, the loadmaster will secure the load and close the ramp using the aft controls.

19.51.2.6. Secure the load for landing and install high altitude CDS safety pins (if required).

19.51.2.7. After completing the malfunction checklist, perform the completion of airdrop checklist.

NOTE: If the malfunction was due to a failure of the static-line retriever or CDS remote timer system, the mission may be continued using the opposite static line retriever and manually activating the retriever switch at FS 245.

19.52. Combat Rubber Raiding Craft Emergency Procedures. Follow either CDS or towed parachutist emergency procedures as required.

19.53. Container Ramp Bundle Emergency Procedures. Follow either CDS or towed parachutist emergency procedures as required.

19.54. Standard Airdrop Training Bundle (SATB) Emergency Procedures.

19.54.1. SATB fails to release mechanically/falls on the ramp. The loadmaster will:

19.54.1.1. Notify the pilot by stating "Malfunction" with a brief description of the problem.

19.54.1.2. Clear the ramp and door to close.

19.54.1.3. After completing the malfunction checklist, perform the completion of airdrop checklist.

NOTE: Make no attempt to remove the bundle from the ramp prior to closing the ramp and door. Do not attempt further SATB airdrops utilizing the bomb rack.

19.54.2. SATB outside the aircraft and fails to separate. The loadmaster will:

19.54.2.1. Notify the pilot by stating "Malfunction" with a brief description of the problem.

19.54.2.2. Cut the static line on the pilot's command over the DZ.

WARNING: When simulating an airdrop using the cargo ramp and door, a hung bundle could become wedged in the aircraft elevator during turns. Do not attempt to retrieve the SATB. If possible, cut the static line prior to making a turn.

19.54.2.3. Notify the pilot the bundle has been cut away.

19.54.2.4. After completing the malfunction checklist, perform the completion of airdrop checklist.

19.55. High Altitude Emergency Procedures. If a physiological incident occurs, the AC will:

19.55.1. Abort the mission.

19.55.2. Begin descent (pressurization and descent will be determined by the type and degree of sickness or pain).

19.55.3. Ensure the affected person remains on 100 percent oxygen until a medical doctor determines the type of treatment required.

19.55.4. Proceed to the nearest base with qualified medical assistance available.

19.55.5. Advise the control tower of the emergency and request an ambulance meet the aircraft.

19.55.6. Advise attending physician to call Brooks AFB Hyperbaric Medicine (DSN 240-3281/3278, commercial (512)536-3281/3278).

19.56. Amplified Airdrop Checklist. All crewmembers should be familiar with all amplified checklist procedures in **Table 19.3.** before using the abbreviated format in AFI 11-2C-130V3 CL 3, 4 and 5.

Table 19.3. Amplified Airdrop Checklist.

AMPLIFIED AIRDROP CHECKLIST

One minute and five second advisories will be called by the navigator for all airdrops. For personnel airdrops, the aircrew will also relay a twenty and ten minute time advisory to the jumpmaster. Loadmasters will acknowledge all time advisories except the five second call. Time advisories will be called on time regardless of which checklist is being run. Loadmasters will thoroughly review emergency procedures, prebrief verbal/visual signals, and establish coordinated tasks prior to the pre-slowdown checklist.

CABIN ALTITUDE CHECK (Airdrop above 10,000 Feet MSL)

This checklist will be accomplished at a cabin altitude of 10,000 and 15,000 feet. At a cabin altitude of 20,000 feet, this checklist will be accomplished every 15 minutes or with each 5,000-footincrease in altitude, whichever is first, and will be accomplished every 5 minutes above 30,000 feet

WARNING

When the cabin altitude exceeds 10,000 feet MSL all crewmembers will continuously breathe 100 percent oxygen from any available source (regulator, console, or walk around bottle).

NOTE: Do not pressurize cabin altitude below the set parachute activation altitude until all parachutes have been dearmed for high altitude airdrops.

Table 19.3 Amplified Airdrop Checklist (continued).

CABIN ALTITUDE CHECK (Airdrop above 10,000 Feet MSL)

This checklist will be accomplished at a cabin altitude of 10,000 and 15,000 feet. At a cabin altitude of 20,000 feet, this checklist will be accomplished every 15 minutes or with each 5,000-foot increase in altitude, whichever is first, and will be accomplished every 5 minutes above 30,000 feet.

WARNING

When the cabin altitude exceeds 10,000 feet MSL all crewmembers will continuously breathe 100 percent oxygen from any available source (regulator, console, or walk around bottle).

NOTE: Do not pressurize cabin altitude below the set parachute activation altitude until all parachutes have been dearmed for high altitude airdrops.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
1. **" CABIN ALTITUDE CHECKS"** (P)			
2. **"ACKNOWLDGED"** (CP,E,N,LM) a. Masks - On and Connected b. Oxygen Regulators - On c. Mask Hose Connection - Checked d. Regulator Flow Indicator - Checked **NOTE:** Engineer Will Visually Check All Crewmembers in the Cockpit.	1. **"ACKNOWLEDGED"** (CP,E,N,LM) a. Masks - On and Connected b. Oxygen Regulators - On c. Mask Hose Connection - Checked d. Regulator Flow Indicator - Checked e. Buddy Checks - Completed f. Oxygen Console – Checked	1. **"ACKNOWLEDGED"** (CP,E,N,LM) a. Masks - On and Connected b. Oxygen Regulators - On c. Mask Hose Connection - Checked d. Regulator Flow Indicator - Checked e. Buddy Checks - Completed f. Oxygen Console - Checked	1. **"ACKNOWLEDGED"** (CP,E,N,LM) a. Masks - On and Connected b. Oxygen Regulators - On c. Mask Hose Connection - Checked d. Regulator Flow Indicator - Checked e. Buddy Checks - Completed f. Oxygen Console - Checked
3. Aircraft Oxygen System - **"Checked"** (CP)	2. Jumpmaster - Alerted	2. Jumpmaster - Alerted	2. Jumpmaster - Alerted
4. CABIN ALTITUDE CHECKS - **"COMLETE"** (LM,E)	3. CABIN ALTITUDE CHECKS - **"COMPLETE"** (LM,E)	3. CABIN ALTITUDE CHECKS - **"COMPLETE"** (LM,E)	3. CABIN ALTITUDE CHECKS - **"COMPLETE"** (LM,E)

Table 19.3. Amplified Airdrop Checklist (Continued).

PRE SLOWDOWN CHECKLIST

Complete this checklist prior to slowdown. Coordination between the pilot, navigator, and loadmaster will determine the time required to prepare the load for airdrop and the pre slowdown point

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
1. **"CREW, PRE-SLOW-DOWN CHECKLIST"** (N) **NOTE** Pilot will indicate which airdrop checklist will be used.			
2. **"ACKNOWLDGED"** (LM)	1. **"ACKNOWLEDGED"** (LM)	1. **"ACKNOWLEDGED"** (LM)	1**.** **"ACKNOWLEDGED"** (LM)
3. Slowdown, Drop Zone, and Escape - **"REVIEWED"** (P,CP,N)	2**.** Jumpmaster - Alerted	2**.** Jumpmaster - Alerted (If Required)	2**.** Jumpmaster - Alerted (If Required)
4. Pressurization - Depressurizing (E)	3. Helmets - On **WARNING** Ensure all personnel, not involved with the airdrop, remain seated with seat belt fastened, forward of the load and parachutists.	3. Helmets - On **WARNING** Ensure all personnel, not involved with the airdrop, remain seated with seat belt fastened, forward of the load and parachutists.	3. Helmets - On **WARNING** Ensure all personnel, not involved with the airdrop, remain seated with seat belt fastened, forward of the load and parachutists.

Table 19.3. Amplified Airdrop Checklist (Continued)- Pre Slow Down.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
5. CDS/Container Ramp Bundle Flap Setting - **"COMPUTED, (State setting)"** (As Required) (E,CP)	4. CDS Arming Switches - Normal **CAUTION** Visually inspect the switch is dearmed. Some switch guards may not ensure the switch is in the DEARM position. Failure to visually inspect the switch could cause inadvertent activation of the static-line retriever winch.	4. CDS Arming Switches - Normal **CAUTION** Visually inspect the switch is dearmed. Some switch guards may not ensure the switch is in the DEARM position. Failure to visually inspect the switch could cause inadvertent activation of the static-line retriever winch.	4. CDS Arming Switches - Normal **CAUTION** Visually inspect the switch is dearmed. Some switch guards may not ensure the switch is in the DEARM position. Failure to visually inspect the switch could cause inadvertent activation of the static-line retriever winch.
6. Altimeters - **"SET"** (State Setting) (CP,P,N)	5. UHF/VHF Feeder Mixer Switch - OFF (Some Airplanes)	5. UHF/VHF Feeder Mixer Switch - OFF (Some Airplanes)	5. UHF/VHF Feeder Mixer Switch - OFF (Some Airplanes)
7. Red Light - **"ON"** (CP)	6. ADS Ramp Support Arms - Connected	6. Forward Barrier - Checked (Not required for Combat Rubber Raiding Craft)	6. Forward Load(s) - Secured **CAUTION** Forward loads locked into the dual rail system not to be dropped this pass will be secured for one "G" additional forward and aft restraint. **WARNING** Platforms will not be repositioned in-flight for multi-pass extractions.

Table 19.3. Amplified Airdrop Checklist (Continued)-- Pre Slow Down.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
8. Drift, Ground Speed, Altimeter Setting - **"RELAYED"** (N) (AWADS/SKE Formation Lead Only)	7. Jump Platform Lights - As Required	7. Forward and Aft Restraint Straps - Removed **NOTE** The 5,000 pound strap around the forward end of the forward platform will not be removed for the combat rubber raiding craft. **NOTE** Do not remove the forward restraint strap on the aft CRRC platform until step 4 of the Slowdown checklist.	7. Emergency Restraint Chains - Removed/Positioned. For sequential extraction, the correct number of chains and devices will be located forward of the forward most platform.
9. Pressurization - No Pressure/Aux Vent/Manual (E): a. Aux vent may be selected once the aircraft is depressurized if the threat area does not contain a chemical, biological, or radiological (CBR) hazard. b. If the threat area contains a CBR hazard, close the engine bleed air valves/ regulators, select manual pressurization and close the outflow valve.	8. Jump Light Intensity - Set (Day - Bright, Night - Dim)		8. Right Rail Locks - Checked. Ensure: Proper lock setting for platform(s) to be airdropped; fingers inserted between rollers; marks aligned, and lock detent is not visible through oval hole in the detent latch assembly. All locks not used in the platform and aft of platform(s) pinned out.

Table 19.3. Amplified Airdrop Checklist (Continued)--Pre Slow Down.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
10. Computer Airdrop Information - **"CHECKED"** (N) (AWADS/ZM) Check all computer stored information. a. DZ Way Point (1) Enter/Verify TOT (2) Enter/Verify information on DZ information pages 1-2 and 2-2. b. Airdrop: Enter/verify the following from pages 2-3: (1) Drop Reference (V/S/R) (2) Altitude Gate (ON/OFF) (3) Altitude/Ballistic (W/V) (4) Wind Factor 11. SKE Secondary Control Panel **"SET"** (CP) (SKE/AWADS Element Lead and Wingmen Only)	9. Aft Anchor Cable Supports - Lowered (Paratroop Door Exit Only) 10. Anchor Cable - Attached to center anchor cable supports (Paratroop door exit only) 11. Anchor Cable Stops - Positioned and Secured (Tailgate Exit Only) 12. Static-Line Retriever Cables - Safety Tied and Checked	8. Static-Line Retriever Cables – Safety Tied (If Required) 9. Jump Light Intensity - Set (Day - Bright, Night - Dim) 10. ADS Ramp Support Arms – Connected 11. CDS Retriever Cable, Release Gate and Knife – Checked **NOTE** Ensure maximum tension is on the Type XXVI release gate. Insufficient tension will result in a slow cut of the gate and/or lightweight container raising off the floor. Tightening of the gate inflight will only be accomplished by ratcheting to remove slack. Do not release the spool to restart the ratcheting process. 12. High Altitude CDS Safety Pins - Removed (As required) On CDS loads rigged for high altitude airdrops, remove the safety pins on all timer elements for loads dropped on this pass.	9. Static-Line Retriever Cables - Safety Tied (If Required) 10. Cargo Floor and Ramp Vertical Restraint Flanges - Retracted and Secured 11. Applicable Left Dual Rail Tiedown Rings - Positioned Aft 12. Jump Light Intensity - Set (Day - Bright, Night - Dim) 13. ADS Ramp Support Arms - Connected 14. Load and Extraction System - Checked a. Extraction Parachute and Line. b. EFTC Latch Assembly c. EFTC Actuator Arm **NOTE** Ensure the bolts in the EFTC link adapter, the latch assembly, and the bolts through the spacers in the link assembly are in a straight line with the longitudinal axis of the aircraft.

Table 19.3. Amplified Airdrop Checklist (Continued)--Pre Slow Down.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
12. SKE Antenna (For SKE ZM Drops) **"BOTTOM"**- (CP)	13. Bundle Marker Lights - On (If Required)	13. Container Marker Lights – On (As Required)	15. Load Marker Light(s) - On (If Required)
13. ZM Select Switch (For SKE ZM Drops) **"ON"** (P)	14. Parachute/Restraint Harness - On and adjusted (Attached as required)	14. Vertical Restraint Straps – Removed (As Required) **NOTE** All vertical restraint must be removed prior to slowdown, moving from aft to the front of the aircraft.	16. Simul Open Handle - Safety Pin Removed 17. Left Rail Locks - Sequentially unlock platform(s) for this pass. **WARNING** Both loadmasters will be on interphone prior to retracting the left rail locks. **WARNING** Ensure all personnel are forward of the airdrop loads. **WARNING** Secondary loadmaster will visually check that the left hand locks are retracted when the locks are removed with the sequential handle. **WARNING** If the sequential control handle will not unlock the locks, place the simul open handle to the fully opened position and operate the sequential handle to all unlocked position. Secondary loadmaster will visually check as many locks as possible without going aft of the forward edge of the platforms to be dropped that pass.
14. Airdrop/Troop Jump CMPTR-MAN Select Switch - **"AS REQUIRED"** (State Setting) (CP)	15. Seats - Raised (As Required) **CAUTION** For single pass drops, ensure parachutists have secured all seats (as required) and no part protrudes into the aisle. On multiple passes, raise the seats of parachutists to be dropped on that pass prior to slowdown.	15. Appropriate Seats - Raised (As Required) **CAUTION** For single pass drops, ensure parachutists have secured all seats (as required) and no part protrudes into the aisle. On multiple passes, raise the seats of parachutists to be dropped on that pass prior to slowdown.	

Table 19.3. Amplified Airdrop Checklist (Continued)--Pre Slow Down. (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
		16. Parachute/Restraint Harness - On/Adjusted (As required)	18. Appropriate Seats - Raised (As required) **CAUTION** For single pass drops, ensure parachutist have secured all seats (as required) and no part protrudes into the aisle. On multiple passes, raise the seats of parachutists to be dropped on that pass prior to slow down.
			19. Parachute/Restraint Harness - On/Adjusted (As Required)
15. Left Rail Locks - **"RETRACTED"** (Heavy Equip Drops) (LM)			20. Left Rail Locks - **"RETRACTED"** (LM)
16. **"PRE-SLOWDOWN CHECKLIST - COMLETE"** (LM,E)	16. **"PRE-SLOWDOWN CHECKLIST - COMPLETE"** (LM,E)	17. **"PRE-SLOWDOWN CHECKLIST – COMPLETE"** (LM,E)	21. **"PRE-SLOWDOWN CHECKLIST - COMPLETE"** (LM,E)

Table 19.3. Amplilified Airdrop Checklist--Slow Down (Continued).

SLOWDOWN CHECKLIST

Note: The navigator's notification of "30 seconds to slowdown" will initiate this checklist.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
1. **"30 SECONDS TO SLOWDOWN"** (N)	**A. TROOP DOOR EXIT**		
	1. Jumpmaster - Alerted	1. Jumpmaster - Alerted (If Required)	1. Jumpmaster - Alerted (If Required)
2. **"5 SECONDS TO SLOWDOWN"** (N) 3. At Slowdown Point - **"SLOWDOWN NOW"** (N) **NOTE:** At the slowdown point, pilot/copilot will pass/relay the slowdown signal as briefed (as required).	2. Helmet Visor - Lowered **WARNING** Loadmasters will lower their helmet visor before opening any doors and keep them lowered until doors are closed.	2. Helmet Visor - Lowered **WARNING** Loadmasters will lower their helmet visor before opening any doors and keep them lowered until doors are closed.	2. Helmet Visor - Lowered **WARNING** Loadmasters will lower their helmet visor before opening any doors and keep them lowered until doors are closed.
4. Flaps - **"50 PERCENT"** (P/CP) **NOTE:** When aircraft performance at high altitude prohibits the use of 50 percent flaps, they may be set at pilot's discretion.			
5. Auxiliary Hydraulic Pump - **"ON"** (As Required)(CP)			
6. Air Deflector Doors (As required) - **"OPEN"** (CP) **NOTE:** Loadmaster is cleared to open paratroop doors upon hearing the copilot calling air deflector doors "OPEN".	3. Air Deflector Doors - Checked: If possible, check air deflector doors extended. 4. Paratroop Door(s) - Opened and Locked. **WARNING** If an air deflector door fails to open, do not open the respective paratroop door and notify the pilot of this condition.		

Table 19.3. Amplified Airdrop Checklist (Continued)-- Slow Down (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
	WARNING Ensure all paratroopers jumping on this pass, are connected to the anchor cable(s) prior to opening the paratroop doors. **WARNING** Paratroop door(s) will be opened by aircrew loadmaster(s). The safety pin will be installed. Paratroop doors and ramp will not be opened concurrently. **NOTE** Loadmaster is cleared to open paratroop door upon hearing the copilot calling air deflector doors "OPEN".		
	5. Jump Platform(s) - Locked in Place		
	6. Paratroop Door(s) Control - Assumed by Jumpmaster/ Safety **NOTE** Positioning of door bundles is the responsibility of the user and will be positioned after the jumpmaster has completed the door safety checks.		
	7. **"SLOWDOWN CHECKLIST - COMPLETE"** (LM,E)		

Table 19.3. Amplified Airdrop Checklist (Continued)--Slow Down (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
7. Ramp and Door - (If Required) - **"CLEAR TO OPEN"** (LM), **"INDICATES OPEN"** (E) **NOTE** Flight engineer will open ramp and door at 150 KIAS after receiving clearance from the loadmaster. **CAUTION** The engineer will ensure the ramp and door open/ADS RDY light on the ADS or MACAWS panel remains illuminated for the entire drop. Failure of the light to illuminate or to remain illuminated is a no drop condition.	**B. TAILGATE EXIT** 1. Jumpmaster - Alerted 2. Helmet Visor - Lowered **WARNING** Loadmasters will lower their helmet visor before opening any doors and keep them lowered until doors are closed. 3. Ramp and Door - **"CLEAR TO OPEN"** (LM) Check cargo door and ramp fully open, with cargo door locked in up position and flag visible (when possible). **CAUTION** Check aft anchor cable supports up and ramp and door area clear. **NOTE** If cargo door and ramp fail to open normally, the loadmaster may open them from the aft control panel upon clearance from the pilot.	3. Ramp and Door - **"CLEAR TO OPEN"** (LM) Check cargo door and ramp fully open, with cargo door locked in up position and flag visible (when possible). **CAUTION** Check aft anchor cable supports up and ramp and door area is clear. **NOTE** If cargo door and ramp fail to open normally, the loadmaster may open them from the aft control panel upon clearance from the pilot. **WARNING** Before proceeding aft to operate the ramp and door controls, the loadmaster will ensure the lifeline is attached and locked to a tiedown ring no farther aft than FS 677. **WARNING** On combat rubber raiding craft (CRRC) drops, parachutists will line up along side the load but will not move aft of FS 737 (ramp hinge) until the load starts to move aft.	3. Ramp and Door - **"CLEAR TO OPEN"** (LM) Check cargo door and ramp fully open, with cargo door locked in up position and flag visible (when possible). **CAUTION** Check aft anchor cable supports up and ramp and door area is clear. **NOTE** If cargo door and ramp fail to open normally, the loadmaster may open them from the aft control panel upon clearance from the pilot. **WARNING** Before proceeding aft to the aft control panel, restrain all platforms with the left hand detents or chains if the locks fail to engage. When the ramp and door are open and after preceding forward of the platforms, remove left hand detents or chains. Do not proceed aft of an unrestrained load. **WARNING** Prior to proceeding aft to operate the ramp and door controls, the loadmaster will ensure the lifeline is attached and locked to a tiedown ring no farther aft than FS 677.

Table 19.3. Amplified Airdrop checklist (Continued)--Slow Down (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
8. Drift - **"RELAYED/NO CHANGE"** (If Required) (N) (AWADS/SKE Formation Lead Only) Lead navigator will compare drop altitude drift with preflight drift. Formation and element leaders will relay changes to the formation.	**WARNING** Prior to proceeding aft to operate the ramp and door controls, the loadmaster will ensure the lifeline is attached and locked to a tiedown ring no farther aft than FS 677.	**NOTE** For CRRC drops, do not proceed to Step 4 until the aircraft flaps have been reset and the proper CDS aircraft deck angle has been established. 4. Remove the 5,000 pound forward restraint strap on the aft CRRC platform.	
9. Flaps (CDS and Container Ramp Bundles Only) - **"RESET, (State Setting)"** (As Required) (P/CP) Copilot will set flaps in accordance with CDS flap setting chart after drop airspeed is established.	4. Aft Anchor Cable Supports - Lowered (If Required) **CAUTION** Aft anchor cable supports will not be lowered until the engineer states "Indicates Open" . **CAUTION** Aft anchor cable supports must be lowered for tailgating troops.	5. Aft Anchor Cable Supports - Lowered (For personnel, CRRC, and CDS using break-away static lines) **CAUTION** Aft anchor cable supports will not be lowered until the engineer states "Indicates Open".	4. Aft Anchor Cable Supports - Lowered (If Required) **CAUTION** Aft anchor cable supports will not be lowered until the engineer states "Indicates Open". **CAUTION** Aft anchor cable supports must be lowered for tailgating jumpers.
	5. Cargo Ramp and Door Control - Assumed by Jumpmaster/Safety **NOTE** Positioning of the door bundles is the responsibility of the user and will be positioned after the jumpmaster has completed the door safety checks.	6. Static-Line Retriever Cable Compression Spring - Seated (As Required) **NOTE** Failure to insure that the compression spring is fully seated in the spring retainer cup and spring retainer cup in hinge plate may cause the winch to inadvertently cut off.	
		7. CDS Switch - Armed (Some Airplanes). **NOTE** The CDS arming switch for the retriever winch intended for use must be positioned to the ARMED position.	

Table 19.3. Amplified Airdrop Checklist--Slow Down (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
		WARNING The loadmaster from this point on will not position a hand near the retriever winch rewind switches. Failure to comply with the above may result in early release of the load.	
10. **"SLOWDOWN CHECKLIST - COMPLETE"** (LM,E)	6. **"SLOWDOWN CHECKLIST - COMPLETE"** (LM,E) **WARNING** If the airdrop is aborted or a "NO DROP" situation occurs, the loadmaster will acknowledge "NO DROP" and perform the "Completion of Drop Checklist". If the drop is to be reattempted, the airdrop checklist will be reinitiated beginning with the "Pre-Slowdown Checklist".	8. **"SLOWDOWN CHECKLIST - COMPLETE"** (LM,E) **WARNING** If the airdrop is aborted or a "NO DROP" situation occurs, the loadmaster will acknowledge "NO DROP", de-arm the CDS switch (some airplanes), raise aft anchor cable supports (if required), clear the ramp and door to close (if required), secure the load, and perform the "Completion of Drop Checklist". If the drop is to be reattempted, the airdrop checklist will be reinitiated beginning with the "Pre-Slowdown Checklist".	5. **"SLOWDOWN CHECKLIST - COMPLETE"** (LM,E) **WARNING** If the airdrop is aborted or a "NO DROP" situation occurs, the loadmaster will acknowledge "NO DROP", raise aft anchor cable support arms (if required), clear the ramp and door to close, restrain the load(s), and perform the "Completion of Drop Checklist". If the drop is to be reattempted, the airdrop checklist will be reinitiated beginning with the "Pre-Slowdown Checklist".

Table 19.3. Amplified Airdrop Checklist (Continued)-- Release Point.

The following checklist will be used as a reference prior to arrival at the release point. The "ONE MINUTE ADVISORY" will be given on time. The "SLOWDOWN CHECKLIST" may still be in progress after the "ONE MINUTE ADVISORY". A no-drop will be called if the checklist is not complete prior to the "FIVE SECOND" call. A countdown sequence is optional for the "FIVE SECOND" call. If after the "ONE MINUTE ADVISORY", conditions exist that could result in an unsatisfactory drop, a no-drop will be called.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
1. **"CREW, ONE MINUTE ADVISORY"** (N)**, "ACKNOWLEDGED"** (LM) **NOTE** At the navigator's one minute call, SKE/AWADS element leaders depress the FCI "Down Prep" symbol. Flight engineer will back up the pilot.	1. **"ACKNOWLEDGED"** (LM)	1. **"ACKNOWLEDGED"** (LM)	1. **"ACKNOWLEDGED"** (LM)
2. **"FIVE SECONDS"** (N) **NOTE** SKE/Element leaders depress the FCI "Down Prep" symbol. Flight engineer will back up the pilot. **NOTE** Navigators will give a "FIVE SECOND" call prior to arrival at the release point. At this time he will confirm the location of the aircraft with respect to the inflight CARP.		**WARNING** Loadmasters will not position themselves in direct line of travel of the retriever cable and guillotine knife (knives) to preclude being struck in the event of recoil at gate release. **NOTE** After completion of slowdown, the second loadmaster will standby to remove slack from the static-line retriever cable after gate is cut.	

Table 19.3. Amplified Airdrop Checklist--Release Point (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
3. **"GREEN LIGHT"** (N) - **"ON"** (CP) Copilot will simultaneously actuate the ADS chute release button for heavy equipment. SKE/ AWADS element leaders depress FCI "E". **NOTE** For SCNS aircraft, if an automatic drop is desired, ensure the GREEN LIGHT and ADS chute release button are activated at the CARP.		2. Static Line Retriever Rewind Switch - Activated (As Required) **NOTE** On aircraft not modified with CDS switches, or on aircraft where the CDS automatic rewind is not operational, the loadmaster (upon hearing and seeing green light) will activate the static line retriever rewind switch for three seconds. **NOTE** If static line retriever fails to cut the gate at "GREEN LIGHT", perform a manual gate cut (if authorized and briefed) by pulling down sharply on a tiedown strap looped over the static-line retriever winch cable. Delay three seconds after "GREEN LIGHT" is called before performing manual gate cut. **WARNING** Prior to manually cutting the release gate on the forward CRRC platform during dual CRRC platform drops, insure all jumpers with the first CRRC platform have cleared the aircraft	2. Extraction Parachute Manual Release Handle - Pulled (If Required) **NOTE** If the release mechanism fails to release electrically, pull manual release handle after hearing and seeing "GREEN LIGHT".

Table 19.3. Amplified Airdrop Checklist--Release Point (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
		3. CDS Switch - DE-ARM (As Required) **WARNING** De-arm the CDS switch to preclude personnel injury, should the timer fail. 4. Forward Chain Barrier - Removed (If Required) **WARNING** When tailgating parachutists following single stick CDS, the loadmaster will immediately remove forward barrier chain after bundle(s) exit.	3. Right Hand Control Handle - EMERGENCY Position (If Required) **WARNING** If a platform fails to extract and the extraction parachute(s) are fully deployed, for single and sequential heavy equipment platforms, pull the right hand control handle to the EMERGENCY position. **WARNING** For loads using two 28 foot extraction parachutes, pull the right hand control handle to the EMERGENCY position if the extraction parachutes are out of the aircraft, regardless of their condition.
4. **"LOAD CLEAR"** (Or Condition) (LM)	2. Status of Load - **"LOAD CLEAR"** (Or Condition) (LM)	5. Status of Load - **"LOAD CLEAR"** (Or Condition) (LM)	4. Status of Load - **"LOAD CLEAR"** (Or Condition) (LM)

Table 19.3. Amplified Airdrop Checklist (Continued) Completion Of Airdrop.

Note: The navigator's "RED LIGHT" call or loadmaster's "LOAD CLEAR" initiates this checklist.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
	A. Troop Door Exit		
1. **"RED LIGHT"** (N) - **"ON"** (CP) **NOTE** Navigator will monitor the timing for useable DZ length and call "RED LIGHT" at the expiration of that time.	1. Red Lights - On, Jumpmaster/Safety Notified.	1. Red Lights - On, Jumpmaster/Safety Notified (As Required)	1. Red Lights - On, Jumpmaster/Safety Notified (As Required)
2. Flaps (CDS and Container Ramp Bundles Only) - **"50 PERCENT"** (P/CP) Flaps should be reset to 50 percent as soon as the loadmaster calls "LOAD CLEAR"	2. Jump Platform(s) - Folded In (As Required)	2. Static Lines - Retrieved (If Required) **CAUTION** Prior to retrieving static lines, allow the static lines to wrap around together.	2. Static Lines - Retrieved (If Required) **CAUTION** Prior to retrieving static lines, allow the static lines to wrap around together.
	3. Static Lines - Retrieved **CAUTION** During retrieval ensure that static lines are not pulled into the dual rail sections.	3. Aft Anchor Cable Supports -Raised (If Required)	3. Aft Anchor Cable Supports -Raised (If Required)
3. Paratroop Door(s) (If Required) - **"CLOSED AND LOCKED"** (LM)	4. Paratroop Door(s) - **"CLOSED AND LOCKED"** (LM)		
4. Air Deflector Doors (If Required) - **"CLOSED"** (CP) **NOTE** Copilot will close air deflector doors after loadmaster calls paratroop doors "CLOSED AND LOCKED".			

Table 19.3. Amplified Airdrop Checklist (Continued)--Completion Of Airdrop (Continued).

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
5. Ramp and Door (If Required) - **"CLEAR TO CLOSE", "CLOSED AND LOCKED"** (LM), **"CLOSED, DOOR LIGHT OUT"** (E) **NOTE** (Airplanes prior to 72-1288) Engineer will actuate door switch momentarily to the open position and then to the closed position after clearance to close.		4. Ramp and Door (If Required) - **"CLEARED TO CLOSE", "CLOSED AND LOCKED"** (LM) **WARNING** When the cargo door and ramp cannot be closed from the cockpit, the loadmaster will ensure the lifeline is attached and locked to a tiedown ring no farther aft than FS 677 prior to proceeding aft to operate the ramp and door controls.	4. Ramp and Door (If Required) - **"CLEARED TO CLOSE ", "CLOSED AND LOCKED"** (LM) **WARNING** When the cargo door and ramp cannot be closed from the cockpit, the loadmaster will ensure their lifeline is attached and locked to a tiedown ring no farther aft than FS 677 prior to proceeding aft to operate the ramp and door controls.
	5. Parachutes Dearmed (If Required for High Altitude Airdrops)	5. Parachutes Dearmed (If Required for High Altitude Airdrops))	
6. SKE Antenna (For SKE ZM Drops) - **"TOP"** (CP)	6. **"DROP CHECKLIST - COMPLETE"** (LM,E)		
	B. TAILGATE EXIT		
7. Secondary Control Panel - **"SET"** (SKE/AWADS Element lead and wingmen only) (CP)	1. Red Lights On, Jumpmaster/Safety Notified.		
8. Acceleration - **"ACCELERATE NOW"** (N)	2. Static Lines - Retrieved **CAUTION** Prior to retrieving static lines, allow the static lines to wrap around together.		
9 Flaps - **"UP"** (P/CP)	3. Aft Anchor Cable Supports -Raised (If Required)		

Table 19.3. Amplified Airdrop Checklist (Continued)--Completion Of Airdrop (Continued)

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
10. Airdrop/Troop Jump CMPTR -MAN Select Switch - **"AS REQUIRED"** (CP) (SCNS Aircraft) 11. Red Light - **"OFF"** (CP) 12. Auxiliary Pump - **"OFF"** (CP) (If Required) 13. Pressurization - As Required (E) **NOTE** Pressurization may be set, as required, any time after doors are called "Closed and Locked".	4. Ramp and Door - **"CLEAR TO CLOSE", "CLOSED AND LOCKED"** (LM) **WARNING** When the cargo door and ramp cannot be closed from the cockpit, the loadmaster will ensure the lifeline is attached and locked to a tiedown ring no further aft than FS 677 prior to proceeding aft to operate the ramp and door controls. 5. Parachutes - Dearmed (High altitude) (If Required)		
14. **"DROP CHECK-LIST - COMPLETE"** (LM,E)	6. **"DROP CHECKLIST-COMPLETE"** (LM,E)	6. **"DROP CHECKLIST - COMPLETE"** (LM,E)	5. **"DROP CHECKLIST - COMPLETE"** (LM,E)

Table 19.3. Amplified Airdrop Checklist (Continued)--Multiple Rigging.

This checklist will be used when performing multiple deliveries. Upon completion of the MULTIPLE RIGGING CHECKLIST, the checklist for the next type of drop will begin with the PRE-SLOWDOWN CHECKLIST

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
	1. Static-Line Retriever Cable - Repositioned/Safetied	1. Tiedowns - Removed aft of subsequent bundle(s) path	1. Right Hand Control Handle – NORMAL **WARNING** If right hand control handle was pulled to EMERG position for previous extraction, place in NORMAL. Do not position handle to LOAD position with platform(s)/pallet(s) remaining on the aircraft.
	2. Loose Equipment - Secured	2. Emergency Restraint Straps - Repositioned	2. Simul Handle – Down, Pin installed
		3. Static-Line Retriever Cable - Repositioned	3. Left Rail Locks – Locked
			4. Right Rail Locks - Pinned out aft of platform(s) to be dropped this pass.
			5. Multiple Extraction Rigging – Complete **NOTE:** Complete applicable remaining items of aircraft preparation for equipment airdrop and after loading checks, and inspect all items listed in the remarks block of the DD Form 1748.
		4. Loose Equipment - Secured	6. Loose Equipment – Secured
	3. **"MULTIPLE RIGGING CHECKLIST COMPLETE"** (LM)	5. **"MULTIPLE RIGGING CHECKLIST COMPLETE"** (LM)	7. **"MULTIPLE RIGGING CHECKLIST COMPLETE"** (LM)

Table 19.3. Amplified Airdrop Checklist (Continued)--Cleanup Checklist

This checklist will be performed as soon as practical following combat exit. If an immediate landing is planned, the checklist may be delayed until taxi back.

COCKPIT CREW	LOADMASTER PERSONNEL	LOADMASTER CDS	LOADMASTER HEAVY EQUIPMENT
	1. Static-Line Retriever Cable - Rewind	1. Forward Barrier Chains - Stowed	1. Right Rail Lock Spring Tension Setting- Removed
	2. Loose Equipment - Stowed	2. Emergency Restraint Straps - Stowed	2. Pinned Out Right Rail Locks - Pins removed and stowed. Inspection covers closed.
	3. Cargo Compartment - Secured	3. Static-Line Retriever Cable - Rewound	3. Right Hand Master Control Handle - Pull to LOAD position and return to NORMAL position. **WARNING** Do not activate right hand emergency release handle to LOAD position with platform(s)/pallet(s) remaining on the aircraft. **CAUTION** Do not activate right hand emergency release handle with more than minimum tension set on the right hand lock(s). To do so could cause damage to the right hand lock(s).
		4. Pinned Out Right Rail Locks - Pins removed and stowed. Inspection covers closed.	4. Simul Handle - Down, pin installed.
		5. Left Rail Locks - All locks engaged and inspection covers closed.	5. Left Rail Locks - All locks engaged and inspection covers closed.
		6. Loose Equipment - Stowed	6. Loose Equipment - Stowed
		7. Cargo Compartment - Secured	7. Cargo Compartment - Secured

Chapter 20

AEROMEDICAL EVACUATION

Section 20A—General Information

20.1. Mission.

20.1.1. The primary function of the C-130 aircraft for AE is the transport of ill or injured DoD members and their dependents requiring medical support. These AE missions may be directed at any time. The C-130 aircraft will be used with the concurrence of the appropriate medical validating authority.

20.1.2. AE personnel will utilize the procedures in applicable AFI 11-2 and 41- series directives, in conjunction with this publication, to accomplish the AE mission.

20.2. Not Used.

20.3. Waivers and Revisions

20.3.1. Waivers. Use **Chapter 4**, Waiver Protocol for AE related questions or waivers.

20.3.2. Revisions. See **Chapter 1** for suggested improvement or recommendations.

20.4. Aeromedical Evacuation Forms. Forms required will be per applicable AFI/H 11-2 and 41-series publications.

Section 20B—AE Command and Control

20.5. Operational Control and Reporting of Aeromedical Evacuation Forces .

20.5.1. HQ AMC is the lead command for AE. The AC is responsible for ensuring the safety of the flight crew, AE crew, and all patients and passengers. The MCD is responsible for providing medical care to the patients. In matters concerning flight safety, decisions of the AC are final; in matters of patient care, decisions of the MCD are final.

20.5.2. Operational control of AE missions is the same as for other airlift missions.

20.5.3. The AMC Command Surgeon (HQ AMC/SG) is responsible for providing standards and procedures concerning the treatment of patients in-flight, and for approval of any medical equipment used on AE missions.

20.5.4. The MCD will advise the AC when a patient's condition or use of medical equipment may affect aircraft operations.

20.5.5. The AEOO, if available, is responsible for supervising flight line execution of AE missions. The MCD is directly responsible for the safety and medical well being of patients on the aircraft and coordinates enplaning and deplaning procedures with the AEOO and supporting agencies.

20.6. AC Responsibilities.

20.6.1. Assist the MCD in obtaining patient support requirements based on local availability. The MCD will coordinate with the AC for integration of the flight and Aeromedical Evacuation Crew

Members (AECM) for continuing missions in which no crew changes take place including en route transportation, dining, billeting, etc.

20.6.2. Brief the AE crew on the mission, flight plan, flight profile, and current threat (if applicable).

20.6.3. Maintain cabin altitude at the level requested by the GPMRC/TPMRC, tasking AE command element or MCD.

20.6.4. Coordinate with the MCD to determine if any flight restrictions are necessary due to patient conditions and if passengers and cargo may be carried.

20.6.5. Coordinate with the MCD to ensure mission required equipment is available/installed as necessary.

20.6.6. Advise the AECMs of intentions to start engines, taxi, itinerary changes, in-flight difficulties, etc.

20.6.7. Brief the MCD on additional responsibilities of the flight crew.

20.6.8. During Aeromedical Readiness Missions (ARM), coordinate with the Mission Clinical Coordinator (MCC) on planned simulated emergencies and training activities.

20.6.9. Patients or passengers may visit the flight crew compartment per **Chapter 5** of this instruction. The control of patients rests with the MCD, while control of the passengers is the responsibility of the flight crew, in conjunction with the MCD.

20.6.10. Transmit load messages and radio transmissions to GPMRC/TPMRC or tasking AE command element/ground personnel as requested by the MCD.

20.6.11. Coordinate Crash/Fire/Rescue (CFR) vehicle requirements when transiting airfields that are unfamiliar with AE requirements. CFR vehicle will stand by per AFI 32-2001, *The Fire Protection Operations and Fire Prevention Program*, and T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.

20.7. Flight Crew Responsibilities.

20.7.1. Assist the AE crew with aircraft systems.

20.7.2. Provide AECMs who are not qualified on the C-130 with information identified in 20.10.1.

20.7.3. Coordinate an emergency evacuation plan with the MCD.

20.7.4. Operate aircraft systems, i.e., doors, ramps, emergency exits, etc.

20.7.5. Assist the AE crew as necessary, providing such assistance does not interfere with primary duties.

20.7.6. Operate galley and prepare food and beverages for food service provided to patients by AECMs.

20.7.7. Assist with aircraft configuration for AE operations.

20.7.8. Complete pre-flight/emergency briefings.

20.7.9. Assist with and perform applicable roles during ERO procedures in AFI 41-312 Volume 1, *Aeromedical Evacuation Contingency Operations Training (AECOT) Standards--General*, and paragraph **20.24.**.

20.8. Aeromedical Evacuation Crew Responsibilities.

20.8.1. Primarily responsible for patient activities.

20.8.2. Assist flight crew/maintenance with aircraft configuration for AE operations.

20.8.3. Install and remove medical equipment/supplies.

20.8.4. Assist the loadmaster with observation and care of passengers when it doesn't interfere with primary duties.

20.8.5. The MCD or designated AECM should be on aircraft inter-phone (headset) for all phases of flight, and will be on aircraft inter-phone during critical phases of flight to include take-off and landing.

20.8.6. If C-130 qualified/certified, provide AECMs who are not qualified/certified in the C-130 with information identified in 20.10.1.

20.9. Patient Death In-flight. When a suspected death occurs in-flight, the planned itinerary will not be interrupted if the next scheduled stop is a US military airfield. If the next stop is a civilian airfield, that does not service a US military medical facility, or a foreign military airfield, that stop will be over flown (mission requirements allowing). Coordination with command and control agencies is essential. The GPMRC/TPMRC or tasking AE command element must ensure that the MTF anticipating the aircraft's arrival at the civilian/foreign military airfield is informed of the cancellation.

Section 20C—Aeromedical Evacuation Crew Complement and Management

20.10. Aeromedical Evacuation Crew Complement.

20.10.1. Aircrew Qualification. AECMs must be fully qualified on at least one of the following aircraft; the C-9, C-17, C-130, or C-141, and are authorized to log primary flight time while performing duties on operational AE missions. Prior to being utilized as a certified AECM on C-130 aircraft, AECMs must receive training as directed in AFI 11-2AE, Volume 1. A flight crewmember is ultimately responsible for emergency egress and cabin safety.

20.10.2. Crew Complement. A basic AE crew consists of two FNs and three AETs. An alert crew consists of one FN and two AETs. An augmented AE crew consists of one additional FN and AET. The group/squadron chief nurse can adjust the crew complement. The group/squadron chief nurse is the final authority for increasing or decreasing the number of AECMs assigned to AE missions. Physicians, nurses, medical technicians, or other personnel designated as medical attendants (i.e., Critical Care Air Transport Team (CCATT) members) to specific patients does not constitute an augmented AE crew and does not extend crew duty time. Basic crews will not be augmented after crew duty has started.

20.10.3. The appropriate GPMRC/TPMRC or tasking AE command element will notify the C2 agencies or flying organization operations officer of the AE crew complement for each AE mission on C-130 aircraft.

20.11. Aeromedical Evacuation Crew Management. AECMs will be managed according to **Chapter 3** of this instruction.

Section 20D—Aeromedical Evacuation Aircrew Procedures

20.12. Checklists.

20.12.1. General. This instruction and AFI 11-215 set policy and provide guidance for the standardization of contents and maintenance of flight crew checklists. Checklists will be maintained per AFI 11-215 and applicable MAJCOM supplement.

20.12.2. Applicability. This instruction applies to all AECMs assigned to AMC and AMC-gained AE units. It also applies to theater assigned AECMs performing AE duties on the C-130 aircraft.

20.12.3. During all aircraft operations, AECMs will carry and use the guidance contained in their current abbreviated flight crew checklist.

20.12.4. Only MAJCOM/DO and SG approved inserts/briefings pertaining to crew positions will be kept in the abbreviated flight crew checklist binders.

20.12.5. Information in the AECM checklists will not be changed except by published revisions or changes.

Section 20E—AE Airlift Operations

20.13. General.

20.13.1. Determining Factors. Consider the following factors when transporting patients on the C-130 aircraft; patient's diagnosis, condition, equipment, oxygen requirements, in-flight time, in-flight patient care requirements, and the number of medical personnel required. Emphasis must always be on providing quality and appropriate care while minimizing potential risks during transport.

20.13.2. Patient Load Planning Factors. The GPMRC/TPMRC or tasking AE command element determines the size/composition of the patient load on AE missions.

20.13.3. Patient Preparation. A flight surgeon, if available, will determine the patient's suitability for AE on the C-130 aircraft. Medical authorities requesting the patient's evacuation must be informed of the in-flight physical stress on the patient. If the MCD determines the patient's medical condition is beyond the capability of the AE crew or aircraft, they will contact the theater GPMRC/TPMRC or tasking AE command element for further guidance. The MCD, in coordination with the appropriate theater medical validating authority, may refuse to accept any patient whose medical condition is beyond their capability. The MCD will advise the AC when a patient's condition or use of medical equipment may affect aircraft operation.

20.13.4. Equipment for AE Missions. Prior to use onboard AE missions, all medical equipment must be tested and deemed airworthy, and then approved for use by HQ AMC/SGX. For those unique patient moves requiring equipment that has not met the above criteria, contact GPMRC/TPMRC or tasking AE command element. GPMRC/TPMRC or tasking AE command element will obtain approval prior to use onboard the aircraft (applies to that specific mission only). AECMs are responsible for all medical supplies and equipment.

20.13.5. Aircraft Security. See **Chapter 7**.

20.14. En Route Diversions.

20.14.1. The MCD is the medical authority onboard all AE missions and has the responsibility to determine what is beneficial or detrimental to the patient(s). If a physician is onboard, as an attendant to a patient, they will make decisions involving that specific patient's care and may be consulted for advice as appropriate. See guidelines in applicable AFI/H 41- series publication.

20.14.2. Should a diversion become necessary due to a change in patient's condition, the AC will make every effort to comply with the requests of the MCD. Establish communications with the responsible command and control agencies, who will relay the information to the appropriate GPMRC/TPMRC or tasking AE command element.

20.14.3. Should an en route diversion become necessary for reasons other than a change in patient's condition, the aircraft commander will coordinate with the MCD before deciding the point of landing. The welfare of the patients is a prime consideration in all such decisions; however, safety is the final determinant. The AC notifies the responsible command and control agencies of the diversion and requests the appropriate medical agencies be notified.

20.14.4. Normally, patients will be advised of itinerary changes and reasons for the diversion.

20.14.5. If the MCD determines the diversion will be detrimental to the patient, or the AC determines the diversion to be unsafe, the C2 agencies will be advised and guidance requested.

20.14.6. ARMS are the primary means of preparing for AE airlift. These missions can be diverted to fulfill “real" versus "simulated” patient airlift requirements. All medical equipment/kits will be kept operationally ready at all times. The Portable Therapeutic Liquid Oxygen (PTLOX) system, when mission ready, will be filled with liquid oxygen. **EXCEPTION:** The PTLOX system, when mission capable, will be maintained with nitrogen IAW T.O. 15X-2-8-1, *Liquid Oxygen Converter Type CRU-87/U*.

20.14.7. Opportune Airlift. Opportune airlift is preferred to launching a special airlift aircraft. The appropriate GPMRC/TPMRC or tasking AE command element and airlift agency should direct the move. Use of opportune airlift is considered an unscheduled AE mission and managed/reported in the same manner as any other AE mission, to include the change of the mission number when patients are onboard. AECMs on these missions will either be qualified/certified or under supervision while gaining qualification/certification in the affected aircraft.

20.15. Ground Operations.

20.15.1. Engines should be shut down during enplaning and deplaning of patients.

20.16. Refueling Operations.

20.16.1. Refueling normally begins after deplaning patients are off the aircraft and prior to enplaning that station's patients. This minimizes the number of souls on board in case of an emergency. Servicing will be per AFI 32-2001 and T.O. 00-25-172.

20.16.2. Concurrent servicing may be accomplished with patients onboard provided:

20.16.2.1. The Chief Servicing Supervisor (CSS) coordinates with all personnel involved prior to beginning concurrent operations.

20.16.2.2. Prior to starting concurrent servicing, the total number of patients, passengers, and crew on board the aircraft will be given to the fire department.

20.16.2.3. Loading ramps/stairs are in place for immediate use and exits (excluding the overhead escape hatches) are opened for egress.

20.16.2.4. The aircraft is thoroughly ventilated.

20.16.2.5. At least two AECMs (one must be a FN) remain onboard to observe patients and assist patients in the event of an egress.

20.16.3. If cabin lights, lavatories, electrical power to operate medical equipment and aircraft inter-phone are operating prior to refueling, use may be continued during servicing operations. Only those systems, switches or electrical circuits needed to operate equipment to sustain life, may be turned on and used during refueling.

20.16.4. Patients and passengers will not enter or exit the aircraft during servicing. Crewmembers may enter or exit the aircraft only when performing essential duties associated with the concurrent servicing operation.

20.16.5. A member of the flight crew must be positioned in the cargo compartment and have intercom contact with the CSS during refueling operations.

20.16.6. Activities around the aircraft will be kept to a minimum during the refueling process. Onload/offload patient and passenger baggage prior to or after refueling.

20.17. Aircraft Pressurization. Normally altitude restrictions are passed from the GPMRC/TPMRC or tasking AE command element to C2 agencies for flight planning purposes. The MCD will advise the aircraft commander of any new cabin altitude or rate of cabin altitude change restrictions during the pre-flight briefing update.

20.18. Aircraft Configuration.

20.18.1. On designated ARM and operational AE missions, configure the aircraft during pre-flight per AFI 11-2C130V3 Addenda A and T.O. 1C-130A-9.

20.18.2. Litter Support Provisions.

20.18.2.1. Roller conveyers will be stowed, unless required for comfort/baggage pallets. Rollers on the ramp will not be in place during patient onloading or offloading operations.

20.18.2.2. Litter patients will be enplaned feet first and deplaned head first due to minimal degree of ramp incline. This eliminates the need to turn litter patients around on the cargo ramp prior to placing them in the litter tier.

20.18.2.3. Litter support straps will be secured to the aircraft floor prior to take-off. If litters are not in the tier, loose litter support straps will be secured in a top and bottom litter support bracket on the center seat and litter stanchion. This will remove a free-swinging strap hazard.

20.18.2.4. A five (5) high configuration using the center seat and litter stanchions is approved for all AE missions.

20.18.2.5. The seat and litter stanchion ladder will be installed for all AE missions when cargo requirements permit.

20.18.3. Available litter spaces and ambulatory seating will depend on the aircraft cabin's mission configuration.

20.18.4. Therapeutic Oxygen. Therapeutic oxygen is not an integral system on the C-130 aircraft. Use the PTLOX system.

20.18.5. Integral patient/passenger emergency oxygen is not available on the aircraft. In the event of an emergency, patients and passengers will use the Passenger Oxygen Kit (POK) or Emergency Passenger Oxygen System (EPOS).

20.18.6. AECMs will have portable oxygen available. AECMs need not pre-flight personal oxygen equipment on a pressure demand regulator if they are assigned an MA-1 portable oxygen bottle. *Note*: If a pressure demand regulator is used, the oxygen supply will be turned "off" when the personal oxygen equipment is removed.

20.18.6.1. AE units will not maintain MA-1 portable oxygen bottles. MA-1 portable oxygen bottles must be functionally located to ensure proper maintenance, servicing, and storage. Dash 21/ Alternate Mission Equipment (AME) shops ensure MA-1 portable oxygen bottles are serviceable and properly maintained, tested, and stored. Dash 21/AME personnel ensure additional MA-1 oxygen walk around bottles are available for each AE crewmember flying in a primary crew position on AE missions.

20.18.7. Do not secure aircraft or medical equipment adjacent to an emergency exit in a manner that will prevent or impede egress.

20.18.8. Life Preservers. MB-1 flotation devices should be used for litter patients. If unavailable, use the Adult/Child life preserver for litter patients.

20.18.9. Patients not normally transported on the C-130 aircraft:

20.18.9.1. Critical prognosis requiring extensive patient care or medical equipment, i.e., burns or multiple trauma.

20.18.9.2. Respiratory problems requiring large amounts of therapeutic oxygen, ventilator support and/or frequent suctioning.

20.18.9.3. Patients with contagious illnesses.

20.18.9.4. Floor loaded patients with external devices dependent on gravity, i.e., foley catheters or chest drainage systems.

20.18.9.5. High risk neonates without special medical supervision from a neonatal team.

20.19. Passengers and Cargo.

20.19.1. The AC, with the concurrence of the MCD, will ensure maximum aircraft utilization for passengers and cargo. Passenger restrictions based upon patient considerations will be identified when seats are released. At stations with a GPMRC/TPMRC or tasking AE command element, the AEOO/ GPMRC/TPMRC or tasking AE command element will advise the appropriate C2 agencies of the number of seats available for passengers.

20.19.2. Cargo and passengers may be carried with patients unless a clear detriment to the health and well being of the patient or passengers can be demonstrated. The decision will be made by the MCD, considering the need for maximum utilization of the aircraft. Conflicts will be referred to the respective GPMRC/TPMRC or tasking AE command element for a decision. Litters will be positioned forward of cargo pallets (if possible). If cargo is in place, and the AC and MCD agree, patients may be transported aft of the cargo.

20.19.3. Cargo will not be bumped except in unusual/abnormal cases, and only after the MCD has coordinated with the aircraft commander and notified the local GPMRC/TPMRC or tasking AE command element.

20.19.4. Do not move ambulatory patients to litters in order to provide seating for additional patients or passengers.

20.19.5. When required/mission load permits, a minimum of one seat will be reserved for every three litter patients on all AE missions. A minimum of two litters will be set up for ambulatory patient use on mission legs scheduled to exceed four hours in length. In addition, an emergency litter will be set up on all AE missions.

20.19.6. Hazardous cargo will not normally be transported aboard AE missions except in extreme circumstances.

20.20. Crash/Fire/Rescue.

20.20.1. Aircraft carrying patient(s) will be provided CFR protection per T.O. 00-25-172. Stand-by CFR vehicle is not necessary during normal operations. A CFR vehicle can be available upon request. The flight crew will coordinate CFR requirements.

20.20.2. At non-AMC bases, non-U.S. military bases, and civilian airfields, the controlling agency will coordinate the CFR coverage, as necessary. The request for CFR vehicle coverage may be denied. This will not prevent refueling operations from occurring.

20.21. AE Call Sign/Use of Priority Clearance.

20.21.1. For AE missions, use the call sign “Air Evac” followed by the five digit aircraft number (i.e., Air Evac 12345) or mission designator (as required by FLIP). Revert to standard call sign when the AE portion of the mission is completed.

20.21.2. The AE “priority clearance” will be used when carrying patients classified as “urgent” or “priority,” who require urgent medical attention. AE priority will only be used for that portion of the flight requiring expedited handling. ACs will request priority handling if AE missions are experiencing long delays during take-off or landing phases, that will affect a patient’s condition.

20.21.3. This does not allow use of AE priority status simply to avoid ATC delays, make block/departure times, or avoid inconveniences. ATC agencies do not question the motive when an AE priority is declared. Use this status judiciously.

20.22. Load Message.

20.22.1. At military bases, the flight crew will pass inbound load messages to the proper command and control personnel. At civilian airfields, ground control will be notified.

20.22.2. The MCD will complete an AF Form 3858, **C-130/C-141 Aeromedical Evacuation Mission Offload Message**, per procedures in applicable AFI/H 41-series publication.

20.23. Change in Patient Status. Change in patient status will be managed per applicable AFI/H 41-series publication.

Section 20F—Contingency Operations.

20.24. ERO Procedures.

20.24.1. ERO procedures are in AFI 41-312 Volume 1, *Aeromedical Evacuation Contingency Operations Training (AECOT) Standards--General*. ERO procedures for loading patients are authorized for all contingency operations when a time critical environment exists (i.e. non-secure landing zones, etc.), and minimum ground time is essential. ERO procedures can be practiced/trained during ARMs, joint training operations, exercises, etc.

20.24.1.1. The loadmaster will be positioned on the left side, at the foot of the ramp and on headset during actual onload procedures. The loadmaster will observe for aircraft threats, and will enforce compliance with safety requirements.

20.24.1.2. Vehicle supervision is the loadmaster's responsibility.

20.24.1.3. If duties permit, loadmasters will assist AECMs in securing patients.

20.24.1.4. When litter patients are wearing personal gear (i.e. web belts, canteen, helmets, flak vests, etc.), consider loading four (4) high versus five (5) high in the center seat and litter stanchions, to increase space between litters to accommodate gear. If situation requires/permits, remove personal gear from patients and secure on ramp or in a designated area.

20.25. Floor Loading Procedures.

20.25.1. Floor Loading Procedures. Floor loading procedures are outlined in AFI 41-312V1. Floor loading procedures for loading patients are authorized for all contingency operations when a time critical environment exists (i.e. non-secure landing zones, areas faced with enemy siege/hostile fire, humanitarian reasons, etc.), and minimum ground time is essential. Floor loading procedures can be practiced/trained during ARMs, joint training operations, exercises, etc. The cargo area floor will be configured with all rollers removed and/or stowed. The onload can be accomplished with only the center two columns of rollers removed, if time constraints become critical. Two crewmembers are required to work simultaneously in securing the opposite sides of the litters to the floor (applies when securing two or three litters together). See AFI 41-312V1, for enplaning sequence.

20.25.1.1. Ambulatory Patients: If available, any cushioning material may be used for seating, to prevent the patient from having to sit on the bare cargo area floor. Seat ambulatory patients so they face forward in the aircraft. Attach a tiedown device (cargo tiedown strap) for each row of patients, in a manner that it will provide forward restraint and body stability. See T. O. 1C-130A-9 for proper use of the tiedown device.

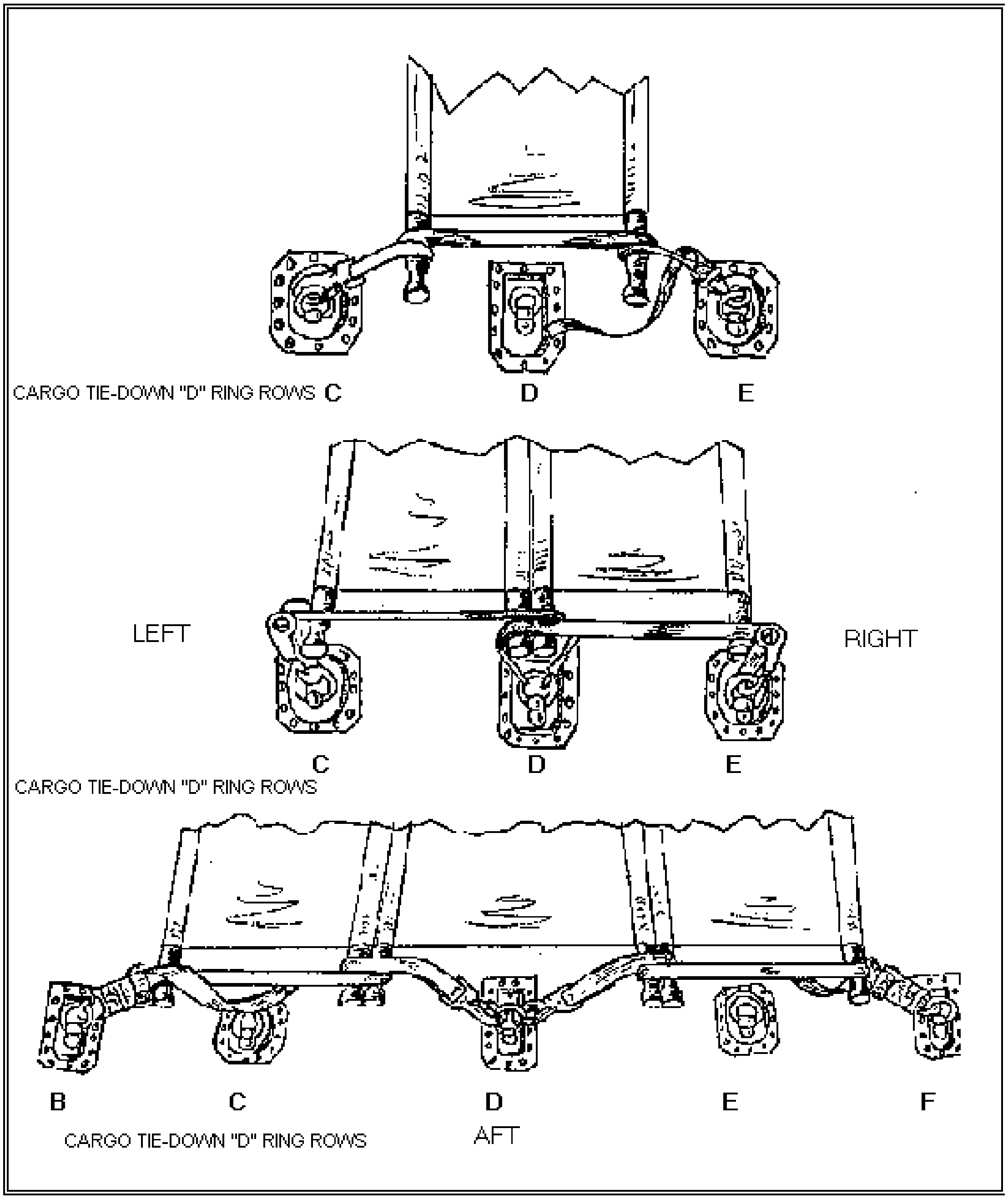
20.25.1.2. Litter Patients: Position litters side-by-side and longitudinally on the cargo area floor, with the patient's head toward the aft of the aircraft. A maximum of 15 litters, comprised of five rows of three litters, can be floor loaded. Medical equipment can be secured on a litter(s) in the forward right sidewall litter tier or on the ramp. Secure the litters to the aircraft floor using the following procedures (see **Figure 20.1.**):

20.25.1.2.1. One litter: Center litter over "D" column. Use one tiedown device at each end of the litter. Connect clamp end of device to a tiedown ring in the "C" column, and run strap webbing over the litter handles, wrapping once around each handle. Attach the hook on the ratchet end of the tiedown device to the tiedown ring in the "E" column on the other side of the litter. Remove slack from strap webbing, and ratchet the tightening device (see T. O. 1C-130A-9 for proper use of the tiedown device). Repeat process at other end of litter.

20.25.1.2.2. Two litters: Place litters side-by-side, and align inboard litter handles over "D" column. Use two tiedown devices at each end of the litters. Connect clamp end of tiedown devices to tiedown ring in "D" column, and run strap webbing over both inboard handles, then over respective outboard handle. Do <u>not</u> wrap strap webbing around any handles. Attach the hook on the ratchet end of the tiedown devices to the tiedown ring in "C" or "E" column (as applicable). Remove slack from strap webbing, and ratchet the tightening device (see T.O. 1C-130A-9 for proper use of the tiedown device). Repeat process at other end of litter.

20.25.1.2.3. Three litters: Place litters side-by-side and center inboard litter over "D" column. Use two tiedown devices at each end of the litters. Connect clamp end of tiedown devices to tiedown ring in "D" column, and wrap strap webbing once around applicable paired litter handles, then over respective outboard handle. Do <u>not</u> wrap strap webbing around outboard handles. Attach the hook on the ratchet end of the tiedown devices to the tiedown ring in "B" or "F" column (as applicable). Remove slack from strap webbing, and ratchet the tightening device (see T.O. 1C-130A-9 for proper use of the tiedown device). Repeat process at other end of litter.

Figure 20.1. Floor Loading Litters Tiedown Diagram.



Section 20G—Crew Duties and Emergency Procedures.

20.26. EXPANDED CREW DUTIES -- MEDICAL CREW DIRECTOR (MCD), FLIGHT NURSE (FN). Use the expanded crew duty checklist in **Table 20.1.**.

Table 20.1. EXPANDED CREW DUTIES - MCD and FN.

AEROMEDICAL EVACUATION CREW MEMBER ABBREVIATIONS
The following abbreviations are used in this section to identify specific Aeromedical Evacuation Crewmembers (AECMs) and their duties: (AEC) Aeromedical Evacuation Crew (entire aeromedical evacuation crew (below) (MCD) Medical Crew Director (FN) Flight Nurse (CMT) Charge Medical Technician (2AET) Second Aeromedical Evacuation Technician (3AET) Third Aeromedical Evacuation Technician (AET) Aeromedical Evacuation Technician (CMT, 2AET, & 3AET)
MEDICAL CREW DIRECTOR. The Medical Crew Director (MCD) ensures the AE aircraft is acceptable and configured for the assigned mission. The MCD supervises the nursing care and management of patients and is responsible for managing the AEC assigned to the mission. The MCD will advise and/or coordinate all pertinent aspects of the mission with the pilot.
FLIGHT NURSE. The Flight Nurse (FN) will assist the MCD as required. The FN provides professional nursing care during all aspects of AE missions, reviews and coordinates in-flight patient care requirements as required with origination and destination MTF personnel, completes appropriate forms, and performs additional duties as assigned by the MCD.
EXPANDED CREW DUTIES – MCD & FN CHECKLIST
AECMs are required to use and refer directly to this publication when accomplishing their abbreviated flight crew checklist duties. The abbreviated flight crew checklist will be used during all phases of the mission. If the checklist is accomplished by one flight nurse, accomplish all MCD and FN duties. When aircraft preparation and loading are accomplished by a ground support crew, the items with an "*" WILL be briefed by ground support personnel prior to the flight crew assuming responsibility. Interior inspection/enplaning duties and procedures may have to be modified as the situation dictates. When crew duties permit, AECMs will make every effort to assist the LM in accomplishing their passenger related duties.
INTERIOR INSPECTION. Use the abbreviated flight crew checklist. 1. Oxygen Mask/MA-1 Bottle/Goggles/LPU/EPOS/POK/EEBD -- Checked (AEC) a. MA-1 bottle serviced. b. Attach mask to MA-1 bottle and check operation. c. Ensure unit is properly secured at duty station. d. Check for currency of EEBD/LPU/EPOS. e. Secure all personal equipment and set up work area. * 2. Cabin Preparation -- Checked (AEC)

a. Rollers off aircraft floor and secured (as required).

b. Assist with configuration of aircraft for patient requirements per configuration plan, T.O. 1C-130A-9, and AFI 11-2C-130V3AA.

(1) Litter stanchions/straps/brackets installed per mission requirements.

(2) Seats are properly secured to the aircraft and seat belts are attached.

c. Infection control/isolation area set up per established procedures. (FN)

* 3. Medical Supplies/Equipment -- Checked/Secured (FN)

a. Secure medications (patient, emergency, and narcotics).

b. Ensure all special medical supplies are available and secured.

c. Report discrepancies to MCD.

4. Aircraft Acceptability/Discrepancies -- Received/Reported (AEC)

a. Report duties accomplished/aircraft acceptance to MCD. (FN)

b. Receive report from FN/CMT on aircraft acceptability. (MCD)

c. Report discrepancies to the LM (as required). (MCD)

LOADING.

NOTE

Inform MCD if leaving aircraft.

1. Aircraft Ready for Enplaning -- Coordinated (AEC)

a. Crew stations assumed for enplaning.

2. Engine Running Onload (ERO) Preparations (As Required) -- Completed (AEC)

a. Coordinate ERO activities with LM. (MCD)

b. At en route stops, prepare cabin for ERO operations after departing the active runway.

* 3. Patient Report/Records/Medications/Supplies/Anti-hijacking Statement -- Received (MCD)

a. Receive patient clinical update, medical records, X-rays, medications, passports/visas, custom forms, anti-hijacking statement, etc., from Medical Treatment Facility (MTF)/ Mobile Air Staging Facility (MASF) personnel.

* 4. Anti-hijacking Procedures -- Checked (FN)

a. Check psychiatric litter patients for sharp objects.

* 5. Patients -- Enplaned (AEC)

a. Coordinate/direct patient enplaning procedures with AEC and MTF/MASF personnel per patient positioning plan. (MCD)

b. Assist with enplaning litter patients.

c. Supervise/assist with enplaning of ambulatory patients/attendants. (FN)

d. Notify MCD of any changes in patient status. (FN)

e. Assist LM (crew duties permitting) with enplaning of passengers (as required). (FN)f. Check patients/passengers for hearing protection.

6. Patient/Passenger Briefing Demonstration -- Completed (AEC)

a. Assist LM with demonstration of LPUs, POKs, EPOS to ambulatory patients/ passengers.

b. Identify emergency exits.

c. Provide individual briefings to litter patients and any other patients requiring a special briefing.

BEFORE TAXI.

1. Patients/Passengers -- Secured (AEC)

WARNING

As a minimum, inside and outside litter brackets will be secured before taxi. Litter support strap securing brackets will be secured before takeoff.

a. Assist CMT with securing litter patients on left side of aircraft. (MCD)

b. Assist 2AET with securing litter patients on right side of aircraft. (FN)

WARNING

If not ready for taxi, the MCD will immediately notify the LM, providing estimated delay time, so the pilot will not begin taxi of aircraft.

2. Souls On Board -- Reported to MCD (FN)

3. Souls On Board -- Reported to LM/AEC (MCD)

4. Before Taxi Checks – “Complete” (MCD)

BEFORE TAKE-OFF.

1. Patient Care -- Completed (AEC)

a. Direct/assist in pre-departure patient care. (MCD)

b. Check condition/comfort of patients.

c. Notify the MCD if a potential delay will occur due to patient needs.

2. Cabin Secure -- Completed (AEC)

a. Ensure all supplies/equipment/baggage are secured.

WARNING

Immediately notify the MCD if the cabin is not secure for take-off.

NOTE

Notify the MCD if AECMs must stand during take-off.

3. Safety Belt -- Fastened (AEC)

4. Cabin Secure -- Reported/Received (AEC)

5. Before Take-off Checks -- “Complete” (MCD)

CRUISE.

1. Patient Check -- Completed (AEC)
   a. Observe patients during ascent.
   b. Check each patient's condition when notified it is safe to move about the cabin. (FN)
2. Patient Care -- Administered (AEC)
   a. Direct AEC in performance of patient care requirements. (MCD)
   b. Assess patient's needs, perform patient care and document.
   c. Administer/document patient medications and treatments. (FN)
   d. Direct and supervise AEC in their duties. (MCD)
3. In-Flight Meal Service -- Completed (AEC)
   a. Coordinate meal service with CMT. (MCD)
   b. Assist in distribution of meals.
   c. Assist patients who require help to eat.

NOTE

Meals should be served in the following order: special diets, litter patients, ambulatory patients.

4. Administrative Duties -- Completed (AEC)
   a. Correct manifest(s) and revise patient positioning plan to reflect cancellations/add-on patients. (MCD)
   b. Separate patient paperwork and medications according to destination medical facility (as required). (MCD/FN)
   c. Prepare AFTO Form 781, Aircrew/Mission Flight Data Document and provide to E. (MCD)
   d. Provide pilot written offload message indicating any special ground support requirements a minimum of 30 minutes prior to estimated time of arrival. (MCD)
   e. Complete all patient records and other mission paperwork.
5. Cabin Cleanliness -- Maintained (AEC)
6. Medical Inventory -- Completed (AEC)

NOTE

Perform inventory during the last sortie of the day.

DESCENT.

1. Patients -- Prepared for Landing (AEC)
   a. Wake patients prior to descent.
   b. Assist in securing patients.
2. Deplaning -- Coordinated (AEC)
   a. Coordinate deplaning procedures at en route stop and/or final destination.
3. Cabin Secure -- Received/Reported (AEC)

a. Secure all supplies/equipment/baggage prior to landing.

b. Report cabin secure status to MCD. (FN)

c. Receive cabin secure report from FN and CMT. (MCD)

WARNING

Immediately notify the MCD if the cabin is not secure for landing.

NOTE

Notify the MCD if AECMs must stand during landing.

d. Observe patients during descent.

4. Descent Checks -- "Complete" (MCD)

BEFORE LANDING.

1. Safety Belt -- Fastened (AEC)2. Cabin Secure -- Received/Reported (AEC)

a. Receive cabin secure report from FN and CMT.

3. Before Landing Checks -- "Complete" (MCD)

OFFLOADING.

NOTE

Inform MCD if leaving aircraft.

1. Deplaning Coordination -- Completed (AEC)

a. Coordinate deplaning procedures with CMT/LM. (MCD)

b. Coordinate with customs, immigrations and agriculture. (MCD)

c. Ensure all supplies/equipment and personal belongings are off-loaded with patients.

2. Patient Report -- Completed (MCD/FN)

a. Provide clinical update and patient records to MTF/MASF personnel. (MCD/FN)

b. Obtain signature for patient records, X-rays, medications, supplies, and equipment being offloaded.

3. Patients -- Deplaned. (AEC)

a. Direct MTF/MASF in patient deplaning procedures. (MCD)

b. Assist with deplaning patients. (FN)

c. Assist LM (crew duties permitting) with deplaning passengers. (FN)

NOTE

Emergency medical equipment will remain on board and ready for use until all patients have deplaned. Individual oxygen masks will not be disconnected until all patients and attendants have been deplaned.

BEFORE LEAVING AIRPLANE.

1. Discrepancies -- Reported (AEC)

a. Report misison/aircraft discrepancies to the MCD. (FN)

b. Receive mission/aircraft discrepancy report from FN/CMT. (MCD) c. Report aircraft discrepancies to LM/flight engineer for documentation on aircraft forms. (MCD) 2. Aircraft Flying Time Forms -- Obtained (MCD) a. Obtain certified "extract" copy of AFTO Form 781. 3. Equipment/Supplies--Removed/Stowed (AEC) a. Identify and tag all inoperable AE equipment. b. Properly repack all medical equipment/supplies. c. Remove all medical equipment/supply kits. d. Remove all professional gear and personal bags per local policy.

20.27. EXPANDED CREW DUTIES - CMT and AET. Use the expanded crew duty checklist for CMT and AET in **Table 20.2.**.

Table 20.2. EXPANDED CREW DUTIES - CMT and AET.

CHARGE MEDICAL TECHNICIAN.
The Charge Medical Technician (CMT) is responsible for the supervision and management of Aeromedical Evacuation Technicians assigned to perform duties on the mission. It will be the responsibility of the CMT to ensure that medical supplies and equipment are on the aircraft and installed equipment is operable. The CMT will normally receive directions from and be responsible to the MCD or their assistant and will also assist the pilot if required.
AEROMEDICAL EVACUATION TECHNICIAN.
The Aeromedical Evacuation Technician(s) (AET) (2AET and 3 AET) will assist the CMT as required. The AETs provide in-flight patient care under the supervision of a qualified FN, complete appropriate forms, and perform additional duties as assigned by the CMT. The 3AET is responsible for all patient baggage procedures.
EXPANDED CREW DUTIES – CMT and AET (2AET/3AET) CHECKLIST
AECMs are required to use and refer directly to this publication when accomplishing their abbreviated flight crew checklist duties. The abbreviated flight crew checklist will be used during all phases of the mission. If the checklist is accomplished by one or two aeromedical evacuation technicians (AET), accomplish all CMT/2AET/3AET duties. Duties may be delegated by the CMT. When aircraft preparation and loading are accomplished by a ground support crew, the items with an "*****" WILL be briefed by ground support personnel prior to the flight crew assuming responsibility. Interior inspection/enplaning duties and procedures may have to be modified as the situation dictates. When crew duties permit, AECMs will make every effort to assist the LM in accomplishing their passenger-related duties.
INTERIOR INSPECTION.
The interior inspection will be accomplished by using the abbreviated flight crew checklist.
***** 1. Form 781-- Checked (CMT)

2. Oxygen Mask/MA-1 Bottle/Goggles/LPU/EPOS/POK/EEBD -- Checked (AEC)
   a. MA-1 bottle serviced.
   b. Attach mask to MA-1 bottle and check operation.
   c. Ensure unit is properly secured at duty station.
   d. Check for currency of EEBD/LPU/EPOS.
   e. Secure all personal equipment and set up work area.

* 3. Cabin Preparation--Completed (AEC)
   a. Rollers off aircraft floor and secured (as required).
   b. Configure aircraft for patient requirements per configuration plan, T.O. 1C-130A-9, and AFI 11-2C-130, Vol. 3, Addenda A.
      (1) Litter stanchions/straps/brackets installed per mission requirements.
      (2) Seats properly secured to the aircraft and seat belts are attached.

* 4. Portable Therapeutic Liquid Oxygen -- Checked (2AET)
   a. Check oxygen quantity and pressure.
   b. Attach oxygen hose(s), flow control device(s), and flow meter(s) and check for proper operation.
   c. Report discrepancies to CMT.

* 5. Electrical System(s) -- Checked (2AET)
   a. Connect Electrical Cable Assembly Set (ECAS) to aircraft following established procedures, ensuring cord(s) are attached to appropriate outlet(s).
   b. Connect electrical frequency converter(s) to aircraft following established procedures.
   c. Medical equipment plugged in.

WARNING

Do not exceed 20 amps per 115 volt AC power outlet.

* 6. Suction/Bag-Valve-Mask (BVM) -- Checked (2AET)
   a. Ensure suction equipment is set up and available for immediate use.
   b. Ensure BVM manual resuscitator is set up for immediate use.
   c. Report discrepancies to CMT.

* 7. Medical Supplies/Equipment -- Checked (2AET)
   a. Ensure medical equipment is accessible and operable.

WARNING

Do not position PTLOX adjacent to hydraulic reservoirs.

   b. Ensure supplies are accessible.
   c. Report discrepancies to MCD.

* 8. Survival Equipment -- Check with LM (CMT)
   a. Appropriate numbers and types of LPUs, EPOS, POKs available for patients/ passengers.

b. Ensure required number of casualty life preservers is available and secured on each side of the cargo compartment.

c. Ensure infant and child life preservers are available and secured near patients.

* 9. Meals/Service Items -- Checked (3AET)

a. Check quantity with LM.

b. Check for special diets.

c. Coordinate with LM on meal service requirements.

d. Report discrepancies to CMT.

10. Aircraft Acceptability/Discrepancies -- Reported (AEC)

a. Report duties accomplished, aircraft acceptance/discrepancies to CMT. (2AET/3AET)

b. Report discrepancies to MCD. (CMT)

LOADING.

NOTE

Inform MCD if leaving aircraft.

*1. Crash/Fire/Rescue (CFR) Vehicle (As Required) -- Available (CMT)

a. Ensure CFR vehicle is available and properly positioned.

2. Engine Running Onload (ERO) Preparations (As Required) -- Completed (CMT)

a. Coordinate ERO activities with MCD.

b. At en route stops, prepare cabin for ERO operations after departing the active runway.

3. Auxiliary Ground Loading Ramps (As Required) -- Installed (CMT)

a. Coordinate with LM for loading configuration and vehicle movement when enplaning patients via the cargo ramp (as required).

* 4. Anti-hijacking Procedures -- Accomplished (CMT)

a. Verify anti-hijacking procedures were accomplished by MTF/ASF/MASF personnel.

b. Perform anti-hijacking procedures if not already accomplished by MTF/ASF/MASF personnel.

* 5. Patients -- Enplaned (AEC)

a. Coordinate/direct enplaning procedures with AEC. (CMT)

b. Assist with enplaning patients.

c. Notify MCD of any changes in patient status. (CMT)

d. Assist LM (crew duties permitting) with enplaning of passengers.

* 6. Baggage Procedures -- Completed (3AET)

a. Accomplish patient baggage manifest.

b. Assist LM with loading/securing of patient/passenger and crew baggage.

7. Patient/Passenger Briefing -- Completed (AEC)

a. Assist LM with demonstration of LPUs, EPOS and POKs to ambulatory patients/ passengers.

b. Identify emergency exits.

c. Provide individual briefings to litter patients and any other patients requiring a special briefing.

BEFORE TAXI.

1. Patients/Passengers -- Secured (AEC)

WARNING

As a minimum, inside and outside litter brackets will be secured before taxi. Litter support strap securing brackets will be secured before takeoff.

a. Ensure all litter patients on left side of aircraft are secured. (CMT)

b. Ensure all litter patients on right side of aircraft are secured. (2AET)

c. Ensure all ambulatory patients and passengers are seated with seat belts securely fastened. (3AET)

WARNING

If not ready for taxi, immediately notify the MCD, providing estimated delay time, so the pilot will not begin taxi of aircraft.

2. Souls-on-Board Report -- Received (AEC)

BEFORE TAKE-OFF.

1. Patient Care--Completed (AEC)

a. Perform pre-departure patient care as directed by MCD/FN.

b. Check condition/comfort of patients.

c. Notify MCD if a potential delay will occur due to patient needs. (CMT)

2. Cabin Secure -- Completed (AEC)

a. Ensure all supplies/equipment/baggage are secured.

WARNING

CMT will immediately notify MCD if the cabin is not secure for take-off.

b. Report cabin secure status to CMT. (2AET/3AET)

c. Receive cabin secure report from 2AET/3AET. (CMT)

NOTE

Notify LM if AECMs must stand during take-off.

3. Safety Belt -- Fastened (AEC)

4. Cabin Secure – Received/Reported (AEC)

a. Receive cabin secure report from 2AET/3AET. (CMT)

b. Report cabin secure to MCD. (CMT)

CRUISE.

1. Patient Check -- Completed (AEC)

a. Observe patients during ascent.
b. Check patient's condition when notified it is safe to move about the cabin.

2. Patient Care -- Administered (AEC)
a. Assess patient's needs, perform patient care and document.
b. Receive direction from MCD in management/performance of patient care requirements.
c. Distribute comfort items and provide fluids every two hours if not contraindicated.

3. In-Flight Meal Service -- Completed (AEC)
a. Coordinate meal service with MCD. (CMT)
b. Assist LM with meal briefing (crew duties permitting). (3AET)
c. Assist in distribution of meals and assist patients who require help to eat.

NOTE

Meals should be served in the following order: special diets, litter patients, ambulatory patients

4. Administrative Duties -- Completed (AET)
a. Complete all patient records. Document all vital signs and intake/output results.
b. Complete baggage manifest for off load station. (3AET)
c. Coordinate agriculture, border clearance, customs, and immigration requirements with LM. (3AET)

5. Cabin Cleanliness -- Maintained (AEC)
a. Collect garbage after meals and prior to descent. (AET)

6. Medical Inventory -- Completed (AEC)

NOTE

Perform inventory during last sortie of the day.

DESCENT.

1. Patients -- Prepared for Landing (AEC)
a. Wake patients prior to descent.
b. Assist in securing patients.
(1) Ensure all litter patients on left side of aircraft are secured. (CMT)
(2) Ensure all litter patients on right side of aircraft are secured. (2AET)
(3) Ensure all ambulatory patients and passengers are seated, seat belts fastened. (3AET)

2. Deplaning -- Coordinated (AEC)
a. Coordinate deplaning procedures at en route stop and/or final destination.

3. Cabin Secure--Completed (AEC)
a. Secure all supplies/equipment/baggage prior to landing.
b. Report cabin secure to CMT. (2AET/3AET)
c. Receive cabin secure from 2AET/3AET. (CMT)
d. Take assigned seat and report cabin secure to MCD. (CMT)

WARNING

CMT will immediately notify MCD if the cabin is not secure for landing.

NOTE

Notify MCD if AECMs must stand during landing.

e. Observe patients during descent.

BEFORE LANDING.

1. Safety Belt -- Fastened (AEC)
2. Cabin Secure -- Received/Reported (AEC)
   a. Receive cabin secure report from 2AET/3AET. (CMT)
   b. Report cabin secure to MCD. (CMT)

OFFLOADING.

NOTE

Inform MCD if leaving aircraft.

1. Deplaning Coordiantion with MCD-- Completed (CMT)
2. CFR Vehicle (As Required) -- Available (CMT)
   a. Ensure CFR vehicle is available and properly positioned near aircraft (as required).
3. Auxiliary Ground Loading Ramps (As Required) -- Installed (CMT)
   a. Coordinate with LM for vehicle movement when deplaning patients via the cargo ramp.
4. Baggage Offloading -- Completed (3AET)
   a. Assist LM with baggage offloading.
5. Patients -- Deplaned (AEC)
   a. Direct patient deplaning procedures. (CMT)
   b. Ensure all supplies/equipment and personal belongings are offloaded with patient.
   c. Assist with deplaning patients.
   d. Assist LM (crew duties permitting) with deplaning passengers.

NOTE

Emergency medical equipment will remain on board and ready for use until all patients have deplaned. Individual oxygen masks will not be disconnected until all patients and attendants have been deplaned.

BEFORE LEAVING AIRPLANE.

1. Discrepancies -- Received/Reported (AEC)
   a. Report mission/aircraft discrepancies to CMT. (2AET/3AET)
   b. Report aircraft and patient care related discrepancies to MCD. (CMT)

2. Equipment/Supplies -- Removed/Stowed (AEC)
a. Identify and tag all inoperable AE equipment.
b. Properly repack and remove all medical equipment/supplies and supply kits.
c. Remove all professioanl gear and personal bags

20.28. AEC Expanded Emergency Procedures. Use the expanded checklists in **Table 20.3.** for Fuselage Fire/Smoke and Fumes Elimination, In-flight Door Warning, and Rapid Decompression. Bold text indicates BOLDFACE response. Use the Ditching Charts in **Table 20.4.** (MCD), **Table 20.5.** (FN), **Table 20.6.** (CMT), **Table 20.7.** (2AET), **Table 20.8.** (3AET). Use **Table 20.9.**, for Landing with Gear Retracted.

Table 20.3. AEC EXPANDED EMERGENCY PROCEDURES.

AEC EXPANDED EMERGENCY PROCEDURES
FUSELAGE FIRE/SMOKE AND FUMES ELIMINATION
1. **OXYGEN--ON, 100 percent (AEC)**
NOTE
Emergency Escape Breathing Device (EEBD)/Protective Breathing Equipment (PBE), Passenger Oxygen Kit (POK), or Emergency Passenger Oxygen System (EPOS) may be used if oxygen mask/eye protection are not available.
2. Crew—Alerted (AEC)
a. Notify loadmaster/pilot (if origin of fire is in cabin) and aeromedical evacuation crew of nature of emergency.
3. Fire--Combat as directed (AEC)
NOTE
The pilot will direct crewmembers to fight the fire as required. Crewmembers not directly involved with combating the fire will proceed with their emergency procedures checklist.
WARNING
Although Halon 1211 vapor has a low toxicity, its decomposition products can be hazardous. On decomposition, Halon 1211 has a characteristic sharp, acrid odor, even in concentrations of only a few parts per million. The odor provides a built-in warning system for the agent and at the same time creates a noxious, irritating atmosphere for those who are in the hazard area during and following a fire. Leave and/or ventilate area after fighting a fire.
NOTE
To use the Halon 1211 fire extinguisher, hold a vertical position, about eight feet from the fire. Remove the pull-ring pin and aim nozzle at base of the fire. Squeeze lever and sweep agent across base of fire.
4. Patients/Passengers--Assist as necessary (AEC)
a. Assist patients/passengers in donning emergency oxygen equipment.
b. Relocate patients/passengers in the vicinity of the fire.
c. Secure patients/passengers in preparation for Smoke and Fumes Removal procedures.

AEC EXPANDED EMERGENCY PROCEDURES

NOTE

Placing a wet towel or handkerchief over the nose and mouth or over the mask, when utilized, affords better protection from smoke and fumes. Relocate the patients and passengers as necessary.

IN-FLIGHT DOOR WARNING

1. OXYGEN--As Required. (AEC)
   a. The pilot will direct all crewmembers to don oxygen (as appropriate) and to select 100% on their oxygen regulators.
2. Crew—Notified (AEC)
3. Patients/Passengers—Secured (AEC)
4. Crewmembers—Secured (AEC)

RAPID DECOMPRESSION

1. **OXYGEN -- ON, 100 PERCENT. (AEC)**
   a. Pilot will direct crew to go on 100% oxygen as required.
   b. If directed, immediately don nearest available emergency oxygen mask.
2. Crewmember - Secured (As Required). (AEC)
   a. If structural damage or aircraft flight maneuvers preclude personnel safety without a seat belt, aeromedical evacuation crewmembers will make every effort to secure themselves in any available seat until it is safe to move about the cabin.
   b. If rapid decompression is not accompanied by unusual aircraft movements, aeromedical evacuation crewmembers will continue with the checklist. If in the litter section, hold on to the nearest litter stanchion or aircraft structure.
3. Patients/Passengers – Assist, As Necessary. (AEC)
   a. When it is safe to move about, check patients/passengers and assist them with their oxygen source.
   b. Ensure all patients/passengers are secured.

Table 20.4. DITCHING CHART-MCD

FIRST ACTION MEDICAL CREW DIRECTOR (MCD)	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
1. Acknowledge pilot's order to prepare for ditching. Reconfirm egress with LM. 2. Brief AEC. a. Any special instructions from pilot. b. Coordinate which litter patients will be moved to seats. 3. Don life preserver. 4. Inflate LPU 6/P (Infant Cot). 5. Brief patients on left side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. c. Inflate life preservers after leaving aircraft. 6. Prepare and secure litter and ambulatory patients on left side of aircraft. a. Assist CMT with positioning patients, checking litter straps and litter support systems on left side of aircraft.	1. Check patients. Ensure patients on left side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. Flashlight. 3. Patient manifest.	1. Assigned seat.	1. Direct and assist patient and passenger egress through aft escape hatch or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft and inflate life preserver. 3. Board life raft.

FIRST ACTION MEDICAL CREW DIRECTOR (MCD)	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
(1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits). b. Apply extra padding and litter straps to litter patients. c. Move litters to lower tier spaces. d. Remove IV lines, catheters, etc. that may impede egress. e. Assist patients in donning life preservers. 7. Distribute medical supplies, medications, and equipment to crewmembers. As a minimum collect narcotics, oral airways, Bag-Valve-Mask resuscitator, flashlight and patient manifest. 8. Secure cabin. a. Secure patients and passengers on left side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 9. Receive cabin secured report from FN/CMT. 10. Report cabin secured to LM.				

Table 20.5. DITCHING CHART-FN.

FIRST ACTION LIGHT NURSE	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
1. Don life preserver. 2. Inflate LPU 6/P (Infant Cot). 3. Brief patients on right side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. c. Inflate life preservers after leaving aircraft 4. Prepare and secure litter and ambulatory patients on right side of aircraft. a. Assist 2AET with positioning patients, checking litter straps and litter support systems on right side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits).	1. Check patients. Ensure patients on right side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. Flashlight	1. Assigned seat.	1. Evacuate aircraft through center escape hatch and inflate life preserver. 2. Assist patients and passengers in boarding life rafts. 3. Board life raft.

FIRST ACTION LIGHT NURSE	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
b. Apply extra padding and litter straps to litter patients. c. Move litters to lower tier spaces d. Remove IV lines, catheters, etc. that may impede egress e. Assist patients in donning life preservers 5. Distribute medical supplies, medications, and equipment to crewmembers. At a minimum collect narcotics, oral airways, Bag-Valve-Mask resuscitator and flashlight. 6. Secure cabin. a. Secure patients and passengers on right side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment 7. Report cabin secured to MCD.				

Table 20.6. DITCHING CHART-CMT.

FIRST ACTION CHARGE MEDICAL TECHNICIAN	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
1. Don life preserver. 2. Inflate LPU 6/P (Infant Cot). 3. Brief patients on left side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. c. Inflate life preservers after leaving aircraft. 4. Prepare and secure litter and ambulatory patients on left side of aircraft. a. Assist MCD with positioning patients, checking litter straps and litter support systems on left side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures; pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits).	1. Check patients. Ensure patients on left side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. First aid kit. 3. Flashlight.	1. Assigned seat.	1. Evacuate aircraft through aft escape hatch and inflate life preserver. 2. Assist patients and passengers in boarding life rafts. 3. Board life raft.

FIRST ACTION CHARGE MEDICAL TECHNICIAN	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
b. Apply extra padding and litter straps to litter patients. c. Move litters to lower tier spaces. d. Remove IV lines, catheters, etc. that may impede egress. e. Assist patients in donning life preservers. 5. Receive medical supplies, medications, and equipment from MCD. Collect first aid kit and flashlight. 6. Remove restraints from psychiatric patients. 7. Secure cabin. a. Secure patients and passengers on left side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 8. Report cabin secured to MCD.				

Table 20.7. DITCHING CHART-2AET.

FIRST ACTION-- 2AET	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
1. Don life preserver. 2. Inflate LPU 6/P (Infant Cot). 3. Brief patients on right side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. c. Inflate life preservers after leaving aircraft. 4. Prepare and secure litter and ambulatory patients on right side of aircraft. a. Assist FN with positioning patients, checking litter straps and litter support systems on right side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits).	1. Check patients. Ensure patients on right side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. First aid kit. 3. Flashlight.	1. Assigned seat.	1. Direct and assist patient and passenger egress through center escape hatch or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft and inflate life preserver. 3. Board life raft.

FIRST ACTION-- 2AET	**DITCHING IMMINENT (10 Minutes Left)**	**PROVIDE**	**POSITION**	**AFTER DITCHING**
b. Apply extra padding and litter straps to litter patients. c. Move litters to lower tier spaces. d. Remove IV lines, catheters, etc. that may impede egress. e. Assist patients in donning life preservers. 5. Receive medical supplies, medications, and equipment from FN. Collect first aid kit and flashlight. 6. Remove restraints from psychiatric patients. 7. Secure cabin. a. Secure patients and passengers on right side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 8. Report cabin secured to CMT.				

Table 20.8. DITCHING CHART-3AET.

FIRST ACTION--3AET	DITCHING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER DITCHING
1. Don life preserver. 2. Inflate LPU 6/P (Infant Cot). 3. Brief ambulatory patients in forward portion of cargo compartment on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. c. Inflate life preservers after leaving aircraft. 4. Prepare/secure ambulatory patients in forward portion of cargo compartment. a. Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. b. Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. c. Assist ambulatory patients and passengers in donning life preservers. 5. Receive medical supplies, medications, and equipment from FN. Collect first aid kit and flashlight. 6. Remove restraints from psychiatric patients. 7. Secure cabin. a. Secure ambulatory patients and passengers in forward portion of cargo compartment; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles/equipment. 8. Report cabin secured to CMT.	1. Check patients and passengers in forward portion of aircraft. Ensure patients and passengers are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. First aid kit. 3. Flashlight.	1. Assigned seat.	1. Direct and assist patient and passenger egress through center escape hatch or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft and inflate life preserver. 3. Board life raft.

Table 20.9. AE EMERGENCY LANDING CHART-MCD.

FIRST ACTION—MCD	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
1. Acknowledge pilot's order to prepare for emergency landing. Reconfirm egress with LM. 2. Brief AEC. a. Any special instructions from pilot. b. Select able-bodied English speaking ambulatory patients and passengers to assist with egress (as required). c. Coordinate which litter patients will be moved to seats. 3. Brief assigned assistants to remain in aircraft to assist in evacuation of patients on left side of aircraft. 4. Brief patients on left side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. 5. Prepare and secure litter and ambulatory patients on left side of aircraft. a. Assist CMT with positioning patients, checking litter straps and litter support systems on left side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. b. Apply extra padding and litter straps to litter patients.	1. Check patients. Ensure patients on left side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment 2. Flashlight. 3. Patient manifest.	1. Assigned seat.	1. Direct and assist patient and passenger egress through left paratroop door or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft. 3. Direct patients and passengers away from aircraft. a. Direct patients and passengers to meet upwind of the aircraft or as directed by the pilot. b. Accomplish a head count and provide numbers to pilot or senior ranking survivor.

FIRST ACTION—MCD	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
c. Move litters to lower tier spaces. d. Remove IV lines, catherers, ect. that may impede egress. 6. Distribute medical supplies, medications, and equipment to assigned assistants and crewmembers. As a minimum, collect narcotics, oral airways, Bag-Valve-Mask resuscitator, flashlight and patient manifest. 7. Secure cabin. a. Secure patients and passengers on left side of aircraft, check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles/equipment. 8. Receive cabin secured report from FN/CMT. 9. Report cabin secured to LM.				

Table 20.10. AE EMERGENCY LANDING CHART--FN

FIRST ACTION FLIGHT NURSE (FN)	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
1. Brief assigned assistants to remain in aircraft to assist in evacuation of patients on right side of aircraft. 2. Brief patients on right side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. 3. Prepare and secure litter and ambulatory patients on right side of aircraft. a. Assist 2AET with positioning patients, checking litter straps and litter support systems on right side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits). b. Apply extra padding and litter straps to litter patients.	1. Check patients. Ensure patients on right side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. Flashlight.	1. Assigned seat.	1. Direct and assist patient and passenger egress through right paratroop door or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft. 3. Direct patients and passengers away from aircraft. a. Direct patients and passengers to meet upwind or as directed by the pilot. b. Accomplish a head count and provide numbers to pilot/MCD/or senior ranking survivor.

FIRST ACTION FLIGHT NURSE (FN)	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
c. Move litters to lower tier spaces. d. Remove IV lines, catheters, etc. that may impede egress. 4. Distribute medical supplies, medications, and equipment to assigned assistants and crewmembers. As a minimum, collect narcotics, oral airways, Bag-Valve-Mask resuscitator, and flashlight. 5. Secure cabin. a. Secure patients and passengers on right side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 6. Report cabin secured to MCD.				

Table 20.11. AE EMERGENCY LANDING CHART--CMT

FIRST ACTION--CMT	LANDING IMMNENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
1. Brief assigned assistants to remain in aircraft to assist in evacuation of patients on left side of aircraft. 2. Brief patients on left side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. 3. Prepare and secure litter and ambulatory patients on left side of aircraft. a. Assist MCD with positioning patients, checking litter straps and litter support systems on left side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits). b. Apply extra padding and litter straps to litter patients. c. Move litters to lower tier spaces.	1. Check patients. Ensure patients on left side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. First aid kit. 3. Flashlight.	1. Assigned seat.	1. Direct and assist patient and passenger egress through left paratroop door or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft. 3. Direct patients and passengers away from aircraft. a. Direct patients and passengers to meet upwind of the aircraft or as directed by the pilot. b. Accomplish a head count and provide numbers to pilot/MCD/or senior ranking survivor.

FIRST ACTION--CMT	LANDING IMMNENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
d. Remove IV lines, catheters, etc. that may impede egress. 4. Receive medical supplies, medications, and equipment from MCD. Collect first aid kit and flashlight. 5. Remove restraints from psychiatric patients. 6. Secure cabin. a. Secure patients and passengers on left side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 7. Report cabin secured to MCD.				

Table 20.12. AE EMERGENCY LANDING CHART--2AET

FIRST ACTION 2AET	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
1. Brief assigned assistants to remain in aircraft to assist in evacuation of patients on right side of aircraft. 2. Brief patients on right side of aircraft on evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell). (1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. (2) Litters - lie flat, grasp sides of litter tightly. 3. Prepare and secure litter and ambulatory patients on right side of aircraft. a. Assist FN with positioning patients, checking litter straps and litter support systems on right side of aircraft. (1) Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. (2) Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. (3) Position litter patients in seats and evacuate as ambulatory (if condition permits). b. Apply extra padding and litter straps to litter patients. c. Move litters to lower tier spaces.	1. Check patients. Ensure patients on right side of aircraft are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. First aid kit. 3. Flashlight.	1. Assigned seat.	1. Direct and assist patient and passenger egress through right paratroop door or as directed by LM; ambulatory followed by litter. 2. Evacuate aircraft. 3. Direct patients and passengers away from aircraft. a. Direct patients and passengers to meet upwind of the aircraft or as directed by the pilot. b. Accomplish a head count and provide numbers to pilot/MCD/or senior ranking survivor.

FIRST ACTION 2AET	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
d. Remove IV lines, catheters, etc. that may impede egress. 4. Receive medical supplies, medications, and equipment from FN. Collect first aid kit and flashlight. 5. Remove restraints from psychiatric patients. 6. Secure cabin. a. Secure patients and passengers on right side of aircraft; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 7. Report cabin secured to CMT.				

Table 20.13. AE EMERGENCY LANDING CHART--3AET

FIRST ACTION--3AET	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
1. Brief assigned assistants to remain in aircraft to assist in evacuation of ambulatory patients and passengers in forward portion of cargo compartment. 2. Brief ambulatory patients in forward portion of cargo compartment in evacuation procedures. a. Identify emergency exits to be used and order in which to evacuate. b. Position to assume at the "Brace for Impact" signal (one long sustained ring on alarm bell).	1. Check patients and passengers in forward portion of aircraft. Ensure patients and passengers are behind cargo, if possible. 2. Take assigned seat. 3. Fasten seat belt.	1. Medical supplies, medications, equipment. 2. First aid kit. 3.Flashlight.	1. Assigned seat.	1. Direct and assist patient and passenger egress through crew entrance door or as directed by LM; ambulatory followed by litter.

FIRST ACTION--3AET	LANDING IMMINENT (10 Minutes Left)	PROVIDE	POSITION	AFTER LANDING
(1) Side facing troop seats - lean forward, place hands behind neck and pull head to knees; elbows should be outside of knees. 3. Prepare and secure ambulatory patients in forward portion of cargo compartment. a. Remove sharp objects, high heels, ties; loosen collars, tight fitting clothing. b. Place sharp objects and loose items in large plastic bag and secure. Remove eyeglasses and dentures, pad and secure on individual. 4. Receive medical supplies, medications, and equipment from FN. Collect first aid kit and flashlight. 5. Remove restraints from psychiatric patients. 6. Secure cabin. a. Secure ambulatory patients and passengers in forward portion of cargo compartment; check seat belts. b. Secure small children with extra litter straps and pad with pillows and blankets as required. c. Secure all loose articles and equipment. 7. Report cabin secured to CMT.				2. Evacuate aircraft. 3. Direct patients and passengers away from aircraft. a. Direct patients and passengers to meet upwind of the aircraft or as directed by the pilot. b. Accomplish a head count and provide numbers to pilot/MCD/or senior ranking survivor.

Chapter 21

SEARCH AND RESCUE

21.1. General. Most rescues involve the saving of lives, therefore, every effort must be made to complete the search as rapidly and efficiently as possible. Accurate navigation significantly increases the probability of detection. The search area must be thoroughly scanned and reactions to sightings must be timely and accurate. This section outlines operational procedures for conducting effective searches in the C-130 aircraft.

21.2. Aircrew Briefings.

21.2.1. When the urgency of the rescue mission compels the crew to scramble, the duty controller will brief the AC and navigator while the rest of the crew completes necessary aircraft inspections.

21.2.2. The AC will brief and discuss with the crew the procedures and crew duties for the mission to include:

21.2.2.1. Sighting procedures.

21.2.2.2. Use of night vision goggles.

21.2.2.3. Preparation of flares and smoke signals.

21.2.2.4. Preparation of personnel and equipment for airborne delivery.

21.2.3. Prior to commencing any low level search, the Pre-Search Checklist will be completed.

21.3. Search Procedures.

21.3.1. Rescue missions often involve commitment based upon calculated risks. Give full consideration to all safety factors. Safety of personnel will not be jeopardized by inadequate preparation or short cuts to expedite takeoff, or arrival at search areas. Operation normal (position) reports will be transmitted each hour or as required by the controlling agency.

21.3.2. The following general instructions apply to all search missions:

21.3.2.1. Crewmembers who did not attend the operations briefing will be briefed on the purpose of the mission.

21.3.2.2. Scanners who are not crewmembers will receive a passenger and a mission objective briefing.

21.3.2.3. The AC will supervise and coordinate activities of crewmembers during preparation for search, as follows:

21.3.2.3.1. Discuss with all crewmembers the scanning procedures.

21.3.2.3.2. Discuss with the navigator and copilot the procedures for making search pattern turns.

21.3.2.3.3. Discuss the radio communication procedures. Maintain radio communications with other search aircraft and the controlling agency.

21.3.2.3.4. Discuss the preparation of flares, sea dyes, and smoke signals for deployment.

21.3.2.3.5. Discuss the preparation of personnel and equipment for airborne delivery.

21.3.2.4. The navigator will:

21.3.2.4.1. Direct the aircraft to ensure proper coverage of the search area and terrain and obstacle clearance, maintain an accurate record of area searched, and debrief controlling agency with an accurate depiction of any areas searched.

21.3.2.4.2. Record sighting information on log and plot position on navigation chart.

21.3.2.4.3. Monitor radar and electronic equipment when using those methods of search.

21.3.2.4.4. When other aircraft are involved, the navigator with assistance of the CSO will track and assign search areas for other aircraft.

21.3.2.4.5. Record aircraft position every 30 minutes and take fuel reading once each hour while on search.

21.3.2.5. The loadmaster will assume supervision of the scanners and schedule rotation and rest periods.

21.3.3. When a search is completed with negative results, the crew will consider searching the area again. Normally, subsequent search legs should be positioned between or 45 degrees to the previous search legs. This procedure, in effect, results in smaller track spacing.

21.3.4. In the Search Area:

21.3.4.1. During concentrated search, the primary search method is visual, augmented by electronic as appropriate.

21.3.4.2. Notify ATC and controlling agency of arrival on scene and your estimated endurance.

21.3.4.3. Descend to predetermined search altitude.

21.3.4.4. Obtain wind at search altitude by best possible means. Be alert to any significant changes in winds and velocity which might impact accuracy of search.

21.3.4.5. When required or tasked, assume on-scene command until relieved. As other aircraft begin to arrive establish contact on channels other than Guard, obtain aircraft type, identification, endurance, and rescue capability, assign altimeter setting, frequencies, search areas, patterns, and altitudes. When required to depart the search area, notify ATC and the appropriate SAR agency, on-scene SAR aircraft, Rescue Coordination Center, etc. If other search aircraft have not arrived, reconfirm position and if possible advise any located survivors when further assistance will arrive.

21.4. Sighting Procedures.

21.4.1. When a sighting is made, the appropriate crewmember will notify the rest of the crew over interphone and indicate the position of the sighting by using the clock position and approximate distance; e.g., "Pilot, 4 o'clock, 500 yards, target."

21.4.2. Immediately upon making a sighting, mark area either by maintaining visual contact (overland) or by dropping a smoke signal and/or sea dye marker (overwater). During search missions, marking devices will be readily available to jettison. The crewmember who launches the smoke will announce over interphone that the marking device has been launched to alert the remainder of the crew to start looking for it.

NOTE: During the presearch briefing, the AC should designate who is responsible to launch marking devices to mark a sighting. This will ensure the sighting and preclude inadvertent multiple launches.

21.4.3. Following the launching of a smoke signal and/or other marker, a turn will be made to bring the aircraft back over the target; or, if the observer can keep the target in sight, the pilot should immediately turn in the direction of the target. The observer will continue to call out the target position and distance to orient the pilot. As the turn progresses, the pilot or copilot should be able to acquire the target.

21.4.4. For confirmed sightings:

21.4.4.1. Keep the target in sight at all times. Mark as required.

21.4.4.2. Report the sighting and condition of any survivors, as well as emergency equipment used or required weather conditions and sea state to the rescue center, OSC, air/ground station, or operating agency, as appropriate.

21.4.4.3. Orbit the Scene. When two planes are available, one should climb to altitude to ensure radar detection by other craft or land bases, the other should remain low, keeping the target in sight. Both aircraft should remain on station until relieved, the rescue has been effected, or they are forced to return to base because of low fuel. In the latter event, the position should be well marked before departing.

21.4.4.4. Drop appropriate emergency equipment. If survivors are in life jackets, attempts should be made as soon as possible to furnish them with life rafts or other survival equipment and signaling devices.

21.4.4.5. Direct potential rescue vessels or aircraft to the scene by radio or visual signals. Radio and visual signals that may be used to direct a vessel to the scene include:

21.4.4.5.1. Radio message to the vessel. Use of ADF to take bearings on a vessel's LF/MF transmissions. Use of the VHF or UHF direction finder to take bearings of these transmissions. If unsure of frequency guarded by the vessel, use 2182 kHz voice or 156.8 MHz VHF/FM.

21.4.4.5.2. When radio communications are not possible, establish location of the target by sending a message by signal light or dropping a message, if possible, or by circling the vessel at least once at low altitude. Fly across the bow of the vessel at least once rocking wings and head in the direction of the target. The procedure should be repeated until the vessel acknowledges by following the aircraft, or indicates by hoisting the International Flag, November (the International Flag, November, is blue and white checkerboard), that it is unable to comply. Crossing the wake of the vessel close astern at a low altitude shall mean that the service of the vessel to which the signal is directed is no longer required.

21.4.4.6. In daytime, inform survivors they have been sighted by flying over with landing lights on, blinking a signal light in their direction, or dropping smoke signals or message streamers.

21.4.4.7. Aircrews sighting survivors at night should mark the position by dropping smokes or float lights.

21.4.4.8. Request assistance from other search aircraft or ships.

21.4.4.8.1. If a rescue vessel arrives in the area, direct it to the scene by giving the target position in relation to the float light. Drop parachute flares to assist the rescue vessel in sighting the target.

21.4.4.8.2. If search objective has not been located, but its position is fairly well established, two float lights should be dropped to outline the limits of the search area, the most probable position of target being halfway between the lights. A search may be started from one light to the other, dropping parachute flares for illumination.

21.4.4.8.3. If no surface vessel is available, but two aircraft are on-scene, have one aircraft fly over the area at 3,000 feet dropping flares at two or three-mile intervals. The other aircraft should position itself three miles behind the illuminating aircraft, slightly upwind at 500 feet to search.

21.5. Scanning Techniques. Precise scanning is one of the most important aspects of a search. During a search, it is expected that all crewmembers will make a cursory examination of the area. However, for maximum effectiveness, personnel must be assigned primary duties as scanners. If available, personnel other than the basic crew should be assigned these duties. Scanners will be thoroughly briefed on scanning techniques prior to beginning a search. The following procedures provide guidance for scanners:

21.5.1. Scanners must be motivated. Without motivation, scanners often merely go through the motions of scanning. They must understand scanning is a vital, integral part of a search mission. Survivors may perish as a result of poor scanning effort.

21.5.2. When briefing scanners include objective characteristics and detection techniques.

21.5.2.1. Large vessels are good visual targets. A moving vessel is easier to detect than a disabled one due to the wake. Detection probability is directly proportional to the size of the vessel.

21.5.2.2. When it is expected that a vessel has foundered or an aircraft has crashed or ditched, the most probable objects of search will be life boats, rafts, debris, oil slicks, and personnel. The debris will be found downwind of the oil slick, personnel are usually in the area of the debris clinging to floating objects, and boats and rafts will be downwind of the debris. (Do not discount the possibility of rafts and boats being upwind.)

21.5.2.3. Scanners should be carefully briefed on how difficult it is to locate a person in the water or survivors in a raft without signaling aids. Rough seas, rough terrain, poor visibility, and poor weather conditions greatly reduce detection probability due to loss of contrast.

21.5.2.4. If the search is to be conducted over heavily wooded terrain, scanners should look for smoke, broken or scarred trees, shiny metal, fresh looking burned-out areas, parachutes, and signals.

21.5.3. Scanning is a tedious task which readily induces fatigue. The following will reduce fatigue and prolong the visual efficiency of scanners. Periodic rotation and rest, use of sun glasses, clean windows, comfortable scanning positions, suitable cabin temperature, and food and refreshments. Scanners should rotate positions each 30 to 60 minutes and rest every two hours.

21.5.4. A routine scanning pattern should be used when searching. The eyes should move and pause for each three or four degrees of lateral or vertical distances at a rate which will cover 10 degrees per second. The scanner's eye movement should be away from the aircraft to the effective visibility and then back toward the aircraft to a point as near under the aircraft as can be comfortably seen. Scanners must avoid turning away from scanning pattern, closing the eyes (blink eyes instead), looking around aircraft, or focusing short of surface being searched.

21.5.5. Pilots should fly past a visible object at the edge of the scanning range to give the scanners an idea of how far out from the aircraft they should be scanning.

21.6. Specific Rescue Mission Guidance. A precautionary rescue mission is any mission in which aircraft are dispatched to be immediately available in the event rescue is required. These missions fall into the following categories: intercept, escort, and orbit.

Table 21.1. Visual Sweep Width Estimates for Daylight Detection Aids.

Device	Estimated Sweep Width (NM)	Search Type
Red/Orange Balloon	0.5	Air or Surface
Orange Flight Suit	0.5	Air
Red Hand Flare (500 candlepower)	0.5	Air or Surface
Day/Night Flare	0.5	Air or Surface
Red Pen Gun Flare	0.75	Air or Surface
Red Orange Flag (3 feet x 3 feet)	1.0	Air or Surface
Red Reflective Paulin	2.0	Air or Surface
Tracer Bullets	2.0	Air or Surface
Green Dye Marker[1]	2.0	Air
Red Meteor (Star) or Parachute Flare (10,000 candlepower)[1]	4.0	Air or Surface
Sun Signal Mirror	5.0	Air or Surface
White Parachute	5.0	Air or Surface
Orange Smoke[2]	6.0	Air or Surface

NOTES.

1. Greatly reduced in heavy seas.
2. Applies in winds less than 6 knots only; degrades to less than 2 NM in winds greater than 10 knots.

Table 21.2. Visual Sweep Width Estimates for Night Time Detection Aids.

Visual Sweep Width Estimates for Night Detection Aids		
Device	**Est. Sweep Width (NM)**	**Search Type**
Strobe (2,000 candle-power peak)	0.5	Air or Surface
Cyalume Personnel Marker Light	1.0	Air or Surface
Electric Flashing SOS Lantern or hand flash-light*	3.0	Air or Surface
Strobe Lifejacket Light	3.5	Air or Surface
Tracer Bullets	4.0	Air or Surface
Red Hand Flare (500 candlepower)	6.0	Air or Surface
Red Very Signals	8.0	Air or Surface
Aircraft Marine Markers	8.0	Air or Surface
Red Pen Gun Flare	8.0	Air or Surface
Red Meteor (Star) or Parachute Flare(10,000 candlepower)	10.0 or limit of Search Visibility	Air or Surface

NOTE: * These estimates were derived from test data collected only on surface searches.

Table 21.3. Uncorrected Visual Sweep Width Chart.

UNCORRECTED VISUAL SWEEP WIDTH -- FIXED-WING AIRCRAFT (ALTITUDES 300-750 FT)

Fixed Wing Searching For	Altitude 300 (ft) Visibility (NM)							Altitude 500 (FT) Visibility (NM)							Altitude 750 (ft) Visibility (NM)						
	1	3	5	10	15	20	30	1	3	5	10	15	20	30	1	3	5	10	15	20	30
Person in Water*	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
Raft 1 person	0.3	0.7	0.9	1.2	1.3	1.3	1.3	0.3	0.7	0.9	1.2	1.4	1.4	1.4	0.3	0.7	0.9	1.2	1.4	1.4	1.4
Raft 4 person	0.4	0.9	1.3	1.7	2.0	2.2	2.2	0.4	1.0	1.3	1.8	2.0	2.2	2.2	0.4	1.0	1.3	1.8	2.1	2.2	2.2
Raft 6 person	0.4	1.1	1.5	2.1	2.5	2.7	2.7	0.4	1.1	1.5	2.2	2.5	2.8	2.8	0.4	1.1	1.6	2.2	2.6	2.8	2.8
Raft 8 person	0.4	1.2	1.6	2.3	2.6	2.9	2.9	0.4	1.2	1.6	2.3	2.7	2.9	2.9	0.4	1.2	1.7	2.3	2.7	3.0	3.0
Raft 10 person	0.4	1.2	1.7	2.4	2.9	3.2	3.2	0.4	1.2	1.7	2.5	2.9	3.2	3.2	0.4	1.3	1.8	2.5	3.0	3.3	3.3
Raft 15 person	0.5	1.3	1.9	2.7	3.2	3.5	4.0	0.5	1.3	1.9	2.7	3.3	3.6	4.0	0.4	1.4	1.9	2.8	3.3	3.7	4.1
Raft 20 person	0.5	1.4	2.1	3.1	3.7	4.2	4.8	0.5	1.5	2.1	3.2	3.8	4.2	4.8	0.5	1.5	2.2	3.2	3.8	4.3	4.9
Raft 25 person	0.5	1.5	2.2	3.4	4.1	4.6	5.2	0.5	1.6	2.3	3.4	4.1	4.6	5.3	0.5	1.6	2.3	3.5	4.2	4.7	5.4
Pwr Boat < 15 ft	0.4	0.8	1.1	1.4	1.6	1.7	1.7	0.4	0.9	1.2	1.5	1.7	1.8	1.8	0.4	0.9	1.2	1.6	1.8	1.9	1.9
Pwr Boat 15-25 ft	0.5	1.6	2.4	3.5	4.3	4.8	4.8	0.5	1.7	2.4	3.6	4.3	4.8	4.8	0.5	1.7	2.4	3.6	4.4	4.9	4.9
Pwr Boat 25-40 ft	0.6	2.1	3.3	5.3	6.6	7.6	9.1	0.6	2.1	3.3	5.3	6.7	7.7	9.1	0.6	2.1	3.3	5.3	6.7	7.7	9.2
Pwr Boat 40-65 ft	0.6	2.6	4.5	8.1	10.9	13.1	16.4	0.6	2.7	4.5	8.1	10.9	13.1	16.5	0.6	2.7	4.5	8.2	10.9	13.1	16.5
Pwr Boat 65-90 ft	0.6	2.8	5.0	9.7	13.5	16.6	3.6	0.6	2.8	5.0	9.8	13.5	16.7	3.7	0.6	2.8	5.0	9.8	13.5	16.7	3.7
Sail Boat 15 ft	0.5	1.5	2.2	3.2	3.8	4.3	4.3	0.5	1.6	2.2	3.2	3.8.	4.3	4.3	0.5	1.6	2.3	3.3	3.8.	4.4	4.4
Sail Boat 20 ft	0.6	1.8	2.6	4.0	4.9	5.6	5.6	0.6	1.8	2.7	4.1	5.0	5.6	5.6	0.5	1.8	2.7	4.1	5.0	5.7	5.7
Sail Boat 25 ft	0.6	2.0	3.1	4.8	6.0	6.9	6.9	0.6	2.0	3.1	4.9	6.1	7.0	7.0	0.6	2.1	3.1	5.0	6.2	7.0	7.0
Sail Boat 30 ft	0.6	2.3	3.6	5.9	7.5	8.8	10.6	0.6	2.3	3.6	5.9	7.6	8.8	10.8	0.6	2.3	3.6	6.0	7.6	8.9	10.7
Sail Boat 40 ft	0.6	2.6	4.3	7.5	10.0	11.9	14.8	0.6	2.6	4.3	7.6	10.0	11.9	14.8	0.6	2.6	4.3	7.6	10.0	11.9	14.9
Sail Boat 50 ft	0.6	2.7	4.6	8.4	11.3	13.6	17.3	0.6	2.7	4.6	8.4	11.3	13.7	17.3	0.6	2.7	4.6	8.5	11.4	13.7	17.4
Sail Boat 65-75 ft	0.6	2.8	4.9	9.3	12.7	15.5	17.0	0.6	2.8	4.9	9.3	12.7	15.5	17.0	0.6	2.8	4.9	9.3	12.7	15.6	17.0
Sail Boat 75-90 ft	0.6	2.8	5.1	9.9	13.7	16.9	22.1	0.6	2.8	5.1	9.9	13.7	17.0	22.1	0.6	2.8	5.1	9.9	13.8	17.0	22.2
Ship 90-150 ft	0.6	2.9	5.4	11.1	15.9	17.0	26.9	0.6	2.9	5.4	11.1	15.9	17.1	26.9	0.6	2.9	5.4	11.1	15.9	17.1	27.0
Ship 150-300 ft	0.6	3.0	5.7	12.5	18.8	24.7	34.8	0.6	3.0	5.7	12.5	18.9	24.7	34.8	0.6	3.0	5.7	12.5	18.9	24.7	34.9
Ship > 300 ft	0.7	3.0	5.8	13.2	17.6	27.9	41.4	0.7	3.0	5.8	13.2	17.6	27.9	41.4	0.7	3.0	5.8	13.2	17.6	27.9	41.4

*For search altitudes up to 500 feet only, the values given for sweep width for a person in water may be increased by a factor of four if it is known that the person is wearing a personal floatation device.

Table 21.4. Uncorrected Visual Sweep Width Chart.

UNCORRECTED VISUAL SWEEP WIDTH -- FIXED-WING AIRCRAFT (ALTITUDES 1000-2000 FT)

Fixed Wing Searching For	Altitude 1000 (ft) Visibility (NM)							Altitude 1500 (ft) Visibility (NM)							Altitude 2000 (ft) Visibility (NM)						
	1.0	3.0	5.0	10.0	15.0	17.0	30.0	1.0	3.0	5.0	10.0	15.0	17.0	30.0	1.0	3.0	5.0	10.0	15.0	17.0	30.0
Person in Water*	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Raft 1 person	0.3	0.7	0.9	1.2	1.4	1.4	1.4	0.2	0.7	0.9	1.3	1.4	1.4	1.4	0.1	0.6	0.9	1.2	1.4	1.4	1.4
Raft 4 person	0.3	1.9	1.3	1.8	2.1	2.3	2.3	0.3	1.0	1.3	1.9	2.1	2.3	2.3	0.2	0.9	1.3	1.9	2.2	2.3	2.3
Raft 6 person	0.4	1.1	1.6	2.2	2.6	2.8	2.8	0.3	1.1	1.6	2.3	2.6	2.9	2.9	0.2	1.1	1.6	2.3	2.7	2.9	2.9
Raft 8 person	0.4	1.2	1.7	2.4	2.8	3.0	3.0	0.3	1.2	1.7	2.4	2.8	3.1	3.1	0.2	1.2	1.7	2.5	2.9	3.2	3.2
Raft 10 person	0.4	1.3	1.8	2.6	3.0	3.3	3.3	0.3	1.3	1.8	2.6	3.1	3.4	3.4	0.2	1.2	1.8	2.7	3.1	3.5	3.5
Raft 15 person	0.4	1.4	2.0	2.8	3.4	3.7	4.2	0.3	1.4	2.0	2.9	3.4	3.8	4.3	0.2	1.4	2.0	3.0	3.5	3.8.	4.4
Raft 20 person	0.4	1.5	2.2	3.2	3.8.	4.3	4.9	0.4	1.5	2.2	3.3	4.0	4.4	5.1	0.3	1.5	2.2	3.4	4.0	4.5	5.1
Raft 25 person	0.4	1.6	2.3	3.5	4.2	4.7	5.4	0.4	1.6	2.4	3.6	4.3	4.8	5.6	0.3	1.6	2.4	3.6	4.4	4.9	5.7
Pwr Boat < 15 ft	0.4	1.0	1.3	1.7	1.8	2.0	2.0	0.3	1.0	1.3	1.7	2.0	2.1	2.1	0.2	1.0	1.3	1.8	2.0	2.2	2.2
Pwr Boat 15-25 ft	0.5	1.7	2.5	3.7	4.4	5.0	5.0	0.4	1.7	2.5	3.7	4.5	5.1	5.1	0.3	1.7	2.5	3.8	4.6	5.1	5.1
Pwr Boat 25-40 ft	0.5	2.2	3.4	5.4	6.8	7.8	9.3	0.5	2.2	3.4	5.5	6.8	7.9	9.4	0.3	2.2	3.4	5.5	6.9	8.0	9.5
Pwr Boat 40-65 ft	0.6	2.7	4.5	8.2	10.9	13.1	16.6	0.5	2.6	4.5	8.2	11.0	13.2	16.6	0.4	2.6	4.5	8.3	11.0	13.3	16.7
Pwr Boat 65-90 ft	0.6	2.8	5.1	9.8	13.6	16.7	3.7	0.5	2.8	5.1	9.8	13.6	16.7	3.8	0.4	2.8	5.0	9.8	13.6	16.8	3.8
Sail Boat 15 ft	0.5	1.6	2.3	3.3	4.0	4.4	4.4	0.4	1.6	2.3	3.4	4.1	4.5	4.5	0.3	1.6	2.3	3.5	4.1	4.6	4.6
Sail Boat 20 ft	0.5	1.8	2.7	4.2	5.1	5.7	5.7	0.4	1.8	2.8	4.2	5.2	5.8	5.8	0.3	1.8	2.8	4.3	5.2	5.9	5.9
Sail Boat 25 ft	0.5	2.1	3.2	5.0	6.2	7.1	7.1	0.5	2.1	3.2	5.1	6.3	7.2	7.2	0.3	2.1	3.3	5.2	6.4	7.3	7.3
Sail Boat 30 ft	0.6	2.3	3.6	6.0	7.6	8.9	10.7	0.5	2.3	3.7	6.1	7.7	9.0	10.8	0.3	2.3	3.7	6.1	7.8	9.1	10.9
Sail Boat 40 ft	0.6	2.6	4.3	7.6	10.9	12.0	14.9	0.5	2.6	4.3	7.6	10.1	12.0	14.9	0.4	2.5	4.3	7.7	10.1	12.1	15.0
Sail Boat 50 ft	0.6	2.7	4.6	8.5	11.4	13.7	17.4	0.5	2.7	4.6	8.5	11.4	13.8	17.5	0.4	2.7	4.6	8.6	11.5	13.8	17.5
Sail Boat 65-75 ft	0.6	2.8	4.9	9.3	12.8	15.6	17.1	0.5	2.8	4.9	9.4	12.8	15.7	17.2	0.4	2.7	4.9	9.4	12.9	15.7	17.2
Sail Boat 75-90 ft	0.6	2.8	5.1	9.9	13.8	17.0	22.2	0.5	2.8	5.1	10.0	13.8	17.1	22.3	0.4	2.8	5.1	10.0	13.8	17.1	22.3
Ship 90-150 ft	0.6	2.9	5.4	11.1	15.9	17.1	27.0	0.5	2.9	5.4	11.1	16.0	17.1	27.0	0.4	2.9	5.4	11.1	16.0	17.1	27.1
Ship 150-300 ft	0.6	3.0	5.7	12.5	18.9	24.7	34.9	0.5	3.0	5.7	12.5	18.9	24.7	34.9	0.4	2.9	5.7	12.5	18.9	24.7	34.9
Ship > 300 ft	0.6	3.0	5.8	13.2	17.6	27.9	41.4	0.5	3.0	5.8	13.2	17.7	27.9	41.4	0.5	3.0	5.8	13.2	17.7	27.9	41.5

Table 21.5. Recommended Visual Search Altitudes.

Search Target	Terrain	Recommended Altitude (Feet)
Persons, Cars, Light Aircraft Crashes	Moderate Terrain	200 to 500
Trucks, Large Aircraft	Moderate Terrain	400 to 1,000
Persons, One Person Rafts, Surfboards, Light Aircraft Crashes	Water or Flat Terrain	200 to 500
Small to Medium Sized Boats, Liferafts, Trucks, Aircraft	Water or Flat Terrain	1,000 to 3,000
Distress Signals	Night (All Terrain)	1,500 to 2,000

Figure 21.1. Parallel Search Pattern Along Object's Route of Flight.

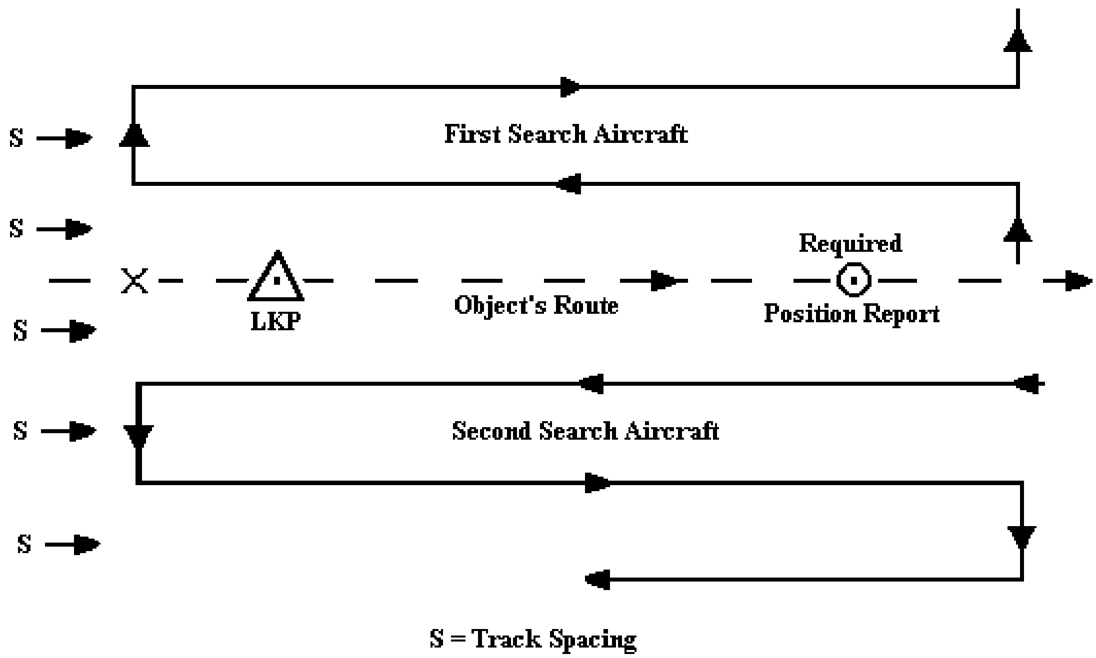


Figure 21.2. Parallel Search Pattern in Large Rectangular Area.

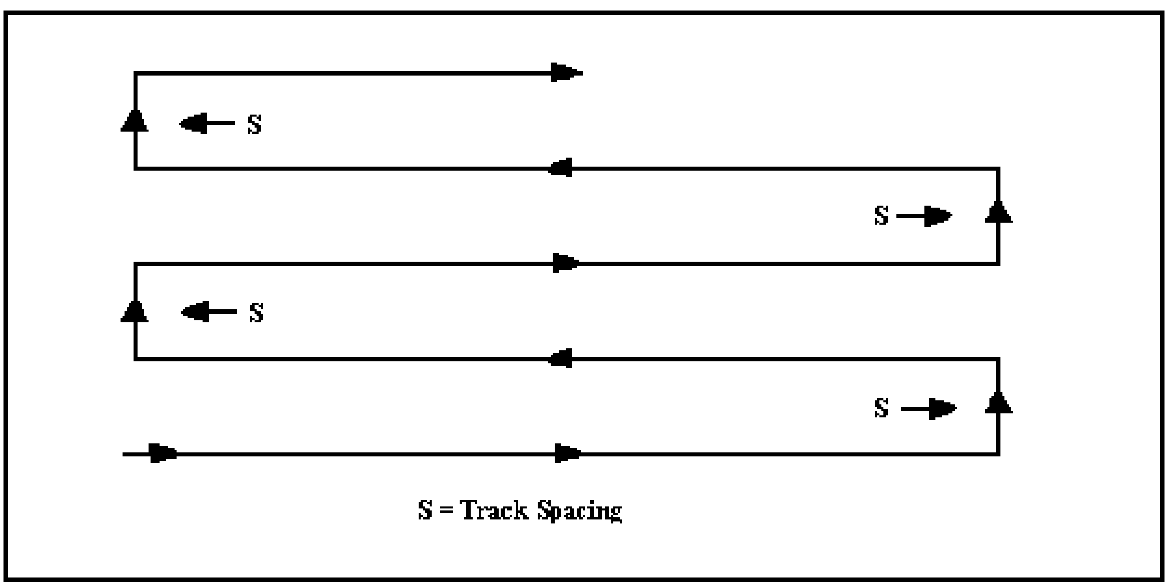


Figure 21.3. Creeping Line Search Along Object Route of Flight.

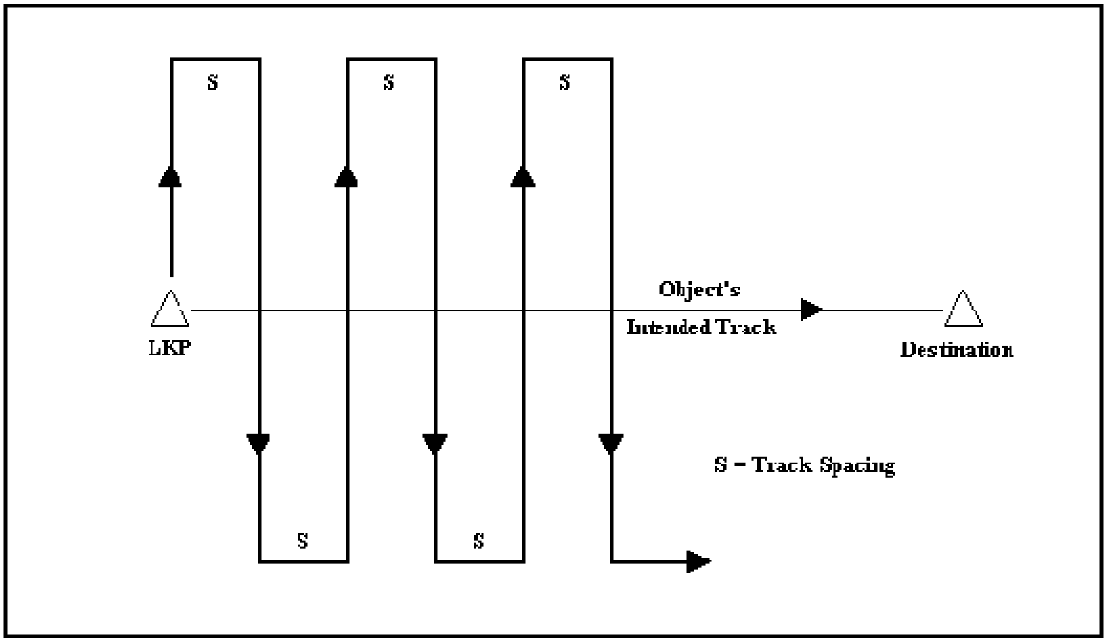


Figure 21.4. Creeping Line Pattern Used in Lieu of Square Search Pattern.

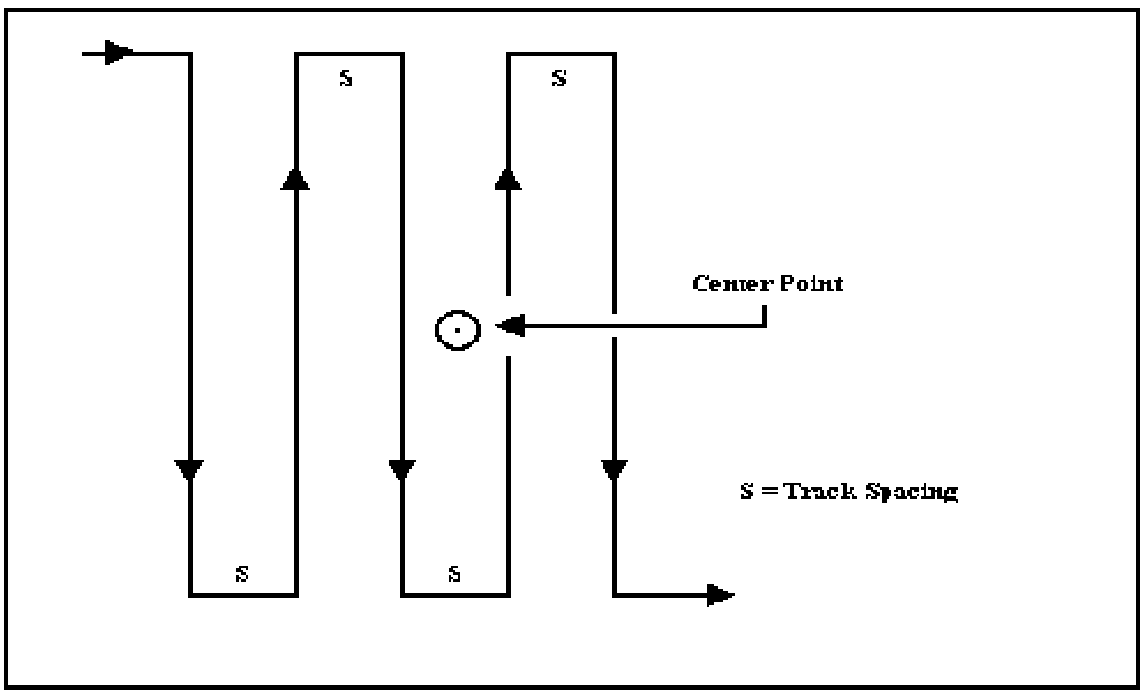


Figure 21.5. Expanding Square Search.

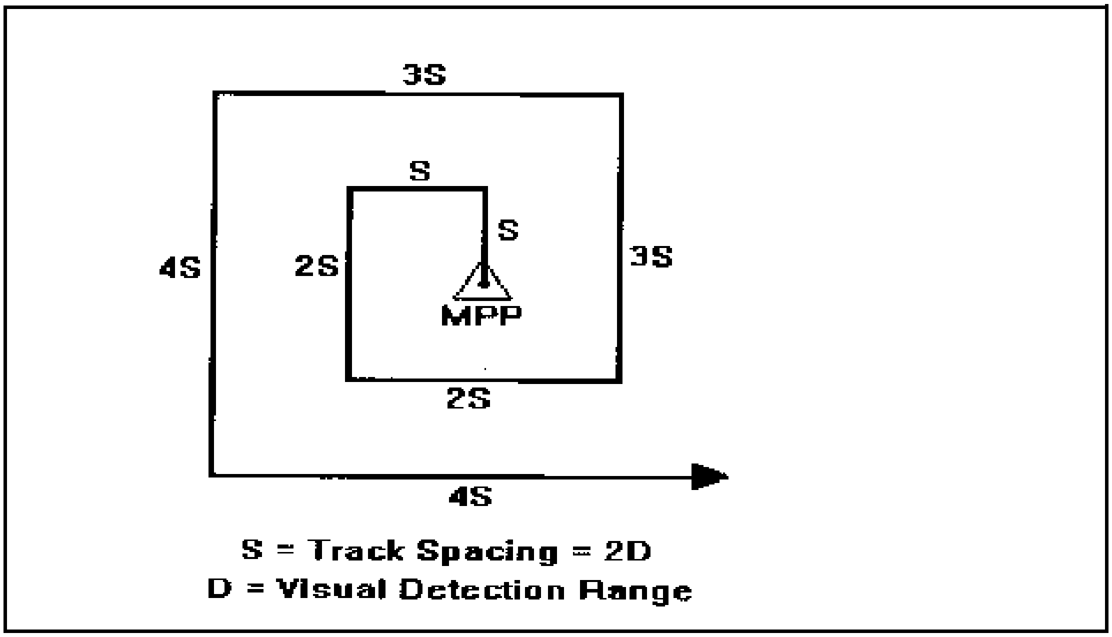


Figure 21.6. Sector Search.

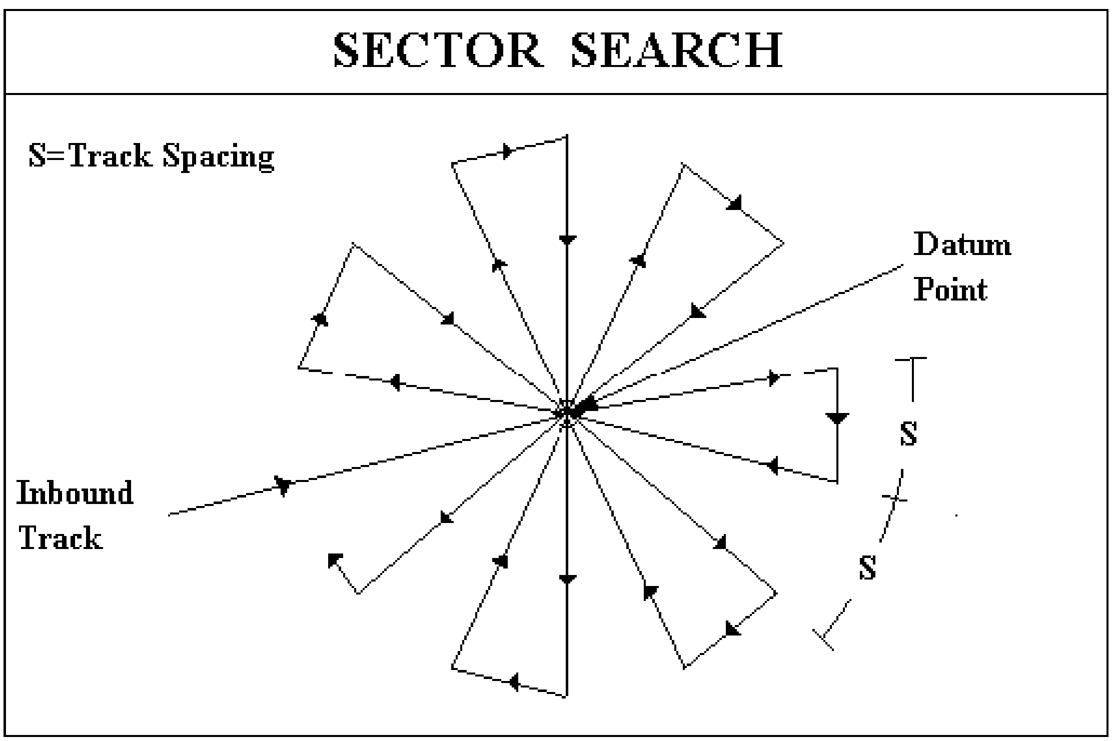


Figure 21.7. Maritime Probability of Detection.

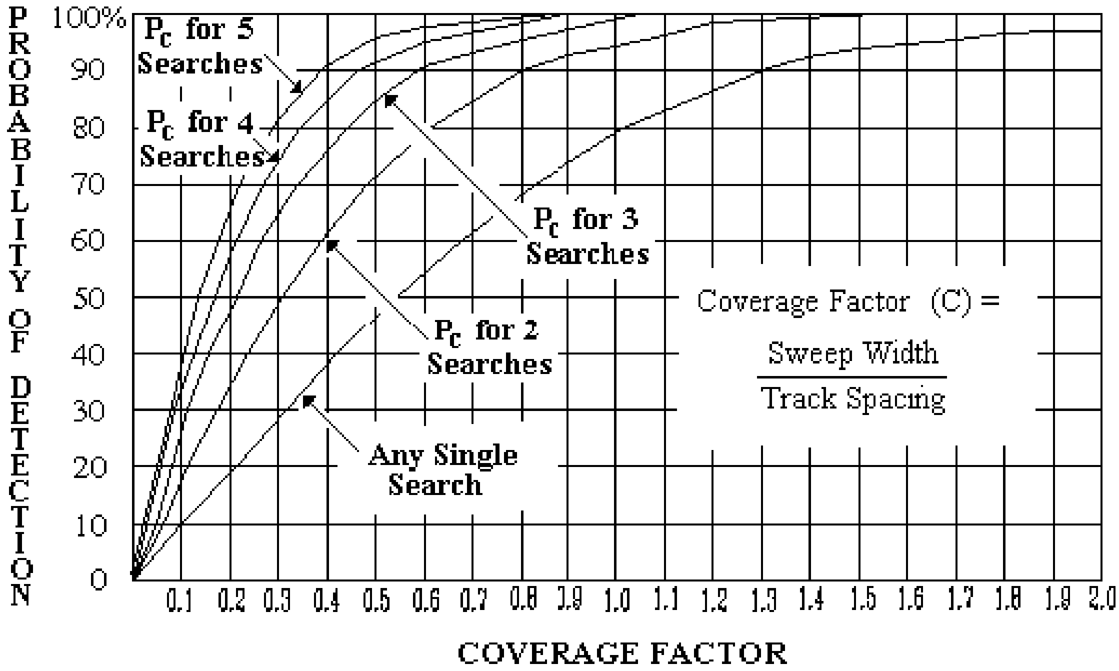


Figure 21.8a. Inland Probability of Detection: Single Search.

Search Alt.	Search Visibility OPEN, FLAT TERRAIN			
Track/Spacing	1 mi	2 mi	3 mi	4 mi
500 ft				
.5 mi	35%	60%	75%	75%
1.0 mi	20	35	50	50
1.5 mi	15	25	35	40
2.0 mi	10	20	30	30
700 ft				
.5 mi	40%	60%	75%	80%
1.0 mi	20	35	50	55
1.5 mi	15	25	40	40
2.0 mi	10	20	30	35
1000 ft				
.5 mi	40%	65%	80%	85%
1.0 mi	25	40	55	60
1.5 mi	15	30	40	45
2.0 mi	15	20	30	35

Figure 21.8b. Inland Probability of Detection: Single Search.

Search Alt	Search Visibility MODERATE TREE COVER (or HILLY)			
Track/Spacing	1 mi	2 mi	3 mi	4 mi
500 ft				
.5 mi	20%	35%	50%	50%
1.0 mi	10	20	30	30
1.5 mi	5	15	20	20
2.0 mi	5	10	15	15
700 ft				
.5 mi	20%	35%	50%	55%
1.0 mi	10	20	30	35
1.5 mi	10	15	20	25
2.0 mi	0	10	15	20
1000 ft				
.5 mi	25%	40%	55%	60%
1.0 mi	15	20	30	35
1.5 mi	10	15	20	25
2.0 mi	5	10	15	20

Figure 21.8c. Inland Probability of Detection: Single Search.

Search Altitude	Search Visibility HEAVY TREE COVER (or VERY HILLY)			
Track/Spacing	1 mi	2 mi	3 mi	4 mi
500 ft				
.5 mi	10%	20%	30%	30%
1.0 mi	5	10	15	15
1.5 mi	5	5	10	10
2.0 mi	5	5	10	10
700 ft				
.5 mi	10%	20%	30%	35%
1.0 mi	5	10	15	20
1.5 mi	5	5	10	15
2.0 mi	5	5	10	10
1000 ft				
.5 mi	15%	20%	30%	35%
1.0 mi	5	10	15	20
1.5 mi	5	10	10	15
2.0 mi	5	5	10	10

Figure 21.9. Contour Search Mountain Peak Pattern.

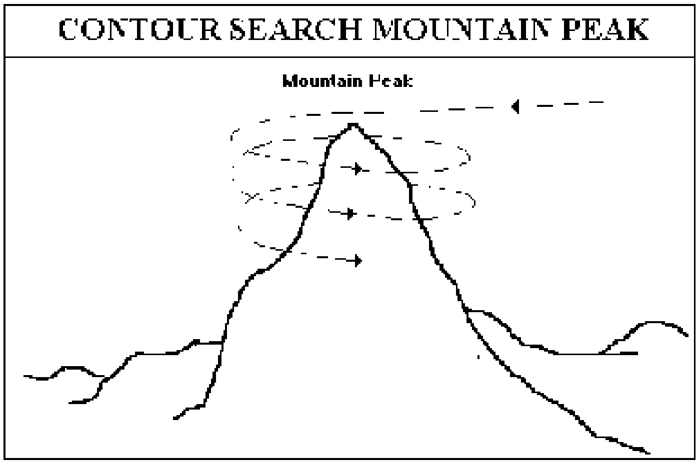


Figure 21.10. Contour Search Mountain Side Pattern.

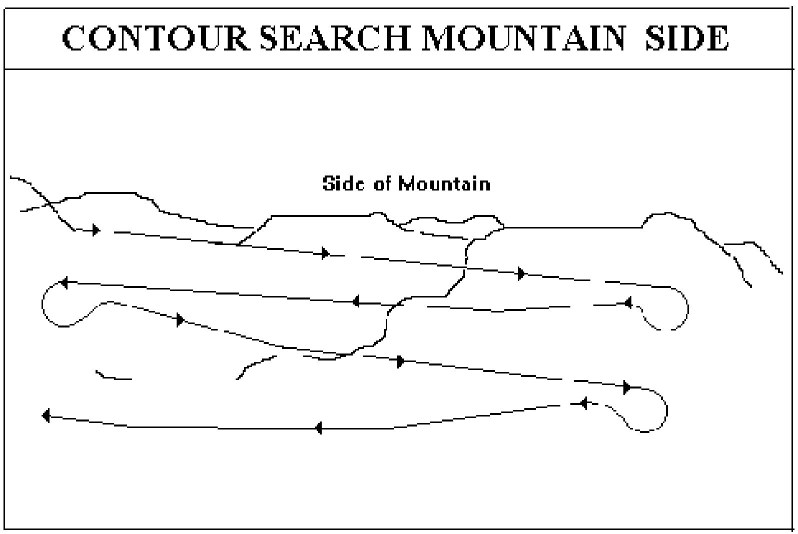


Figure 21.11. Standard Rate Turn Distance.

Distance Traveled Perpendicular to Track in 180^{o} Standard Rate Turns (Turn Diameter)			
Speed(Knots)	Distance(NM)	Speed(Knots)	Distance(Knots)
130	1.4	200	2.1
140	1.5	3.0	2.2
150	1.6	220	2.3
160	1.7	230	2.4
170	1.8	240	2.6
180	1.9	250	2.7
190	2.0	260	2.8

Figure 21.12. Search Pattern Turns.

SEARCH PATTERN TURNS

When flying search patterns, turns must be accurate and uniform as possible. The following procedures will assist in making precise turns:

1. The aircraft will be flown on autopilot when possible.
2. Prior to starting the pattern, the navigator will brief the crew on the direction, rate of turn and the turn command procedure that will be used.
3. During pattern execution, all turns will be standard rate (3 degrees per second) unless track spacing (cross legs) is less in distance than the diameter of a standard rate turn at a given speed. In this situation, turns may be continued to 180 degrees and turn rate adjusted as required to remain within the pattern. Time in turn can be computed as follows:
4. Enter table at desired speed, extract distance.
5. On DR computer, place speed index opposite distance extracted from table.
6. Opposite "Required Distance" (outer scale) read time in which turn must be complete (inner scale). Time will be seconds or minutes and seconds. For example, to attain a diameter of two nautical miles at 120 KTAS, a 180 degree turn must be completed in one minute-thirty-two seconds. A one nautical mile diameter at the same airspeed would require a 180 degree turn of 46 seconds' duration.

NOTE:

The pilot should visually calibrate the turn indicator during turns.

7. When the distance between two parallel legs is less than the diameter of a standard rate turn at a given speed, a 180 degree turn of specified rate and duration may be used; i.e., for one nautical mile of track spacing at 120 knots on parallel search the required distance can be attained by using a 46 second (approximately 4 degrees per second) 180 degree turn.
8. To minimize errors encountered in turns at the ends of search legs, an allowance must be made to offset time gained when a turn is made. The following is an explanation of the relationship between a 90 degree turn and the right angle corner being negotiated by that turn (**Figure 21.1.**, **Figure 21.2.**, **Figure 21.3.**, **Figure 21.4.**, **or** **Figure 21.5.**).
9. The turn is situated so the arc it subtends is tangent to legs of the corner at two points (A and C) equidistant from the corner (B). Each distance (AB and BC) is equal to the radius (r) of the turn.
10. The length of the arc is slightly more that 3/4 of its diameter. The time required to travel the arc AC will, therefore, be approximately 3/4 of that required to travel the straight line distance from A to B to C.
11. To correct basic search pattern time based upon straight line values, the distance gained in turns must be translated into usable time compensation factors; e.g., a standard rate, 90 degree turn required only 30 seconds to complete but accomplished the equivalent of 38 seconds of straight line travel. Therefore, the time compensation factor for a standard rate 90 degrees turn is 38 seconds minus 30 seconds, or eight seconds.
12. In addition to compensating for time gained in a standard rate 90 degree turn, the navigator must also know when to start turning. All turns are started prior to the end of each leg at a distance equal to the radius of the turn being used. This places the aircraft directly on the next leg when the turn is finished. The time required to travel this distance (radius) in a straight line is 19 seconds. Therefore, the turn must be started 19 seconds prior to the end of the leg.
13. On any search pattern employing a succession of 90 degree, standard rate turns, separated by cross legs, the following procedure may be used for computing time to begin each turn.
14. Compute time required to fly entire first leg using GS for that leg.
15. Subtract 19 seconds from the time computed in step 14.
16. Add difference obtained in step 15 to start search time. Resultant will be time to begin first 90 degree turn.
17. Compute time required to fly entire second leg using GS for that leg.
18. Subtract eight seconds from time computed in step 17.
19. Add difference obtained in step 17 to the time that first turn was initiated. Resultant will be time to begin second 90 degree turn.
20. To compute ensuing turn times, continue to subtract eight seconds from successive full leg time (corner to corner) and add resultant to previous turn time.

Figure 21.13. Off Set Course Intercept Pattern.

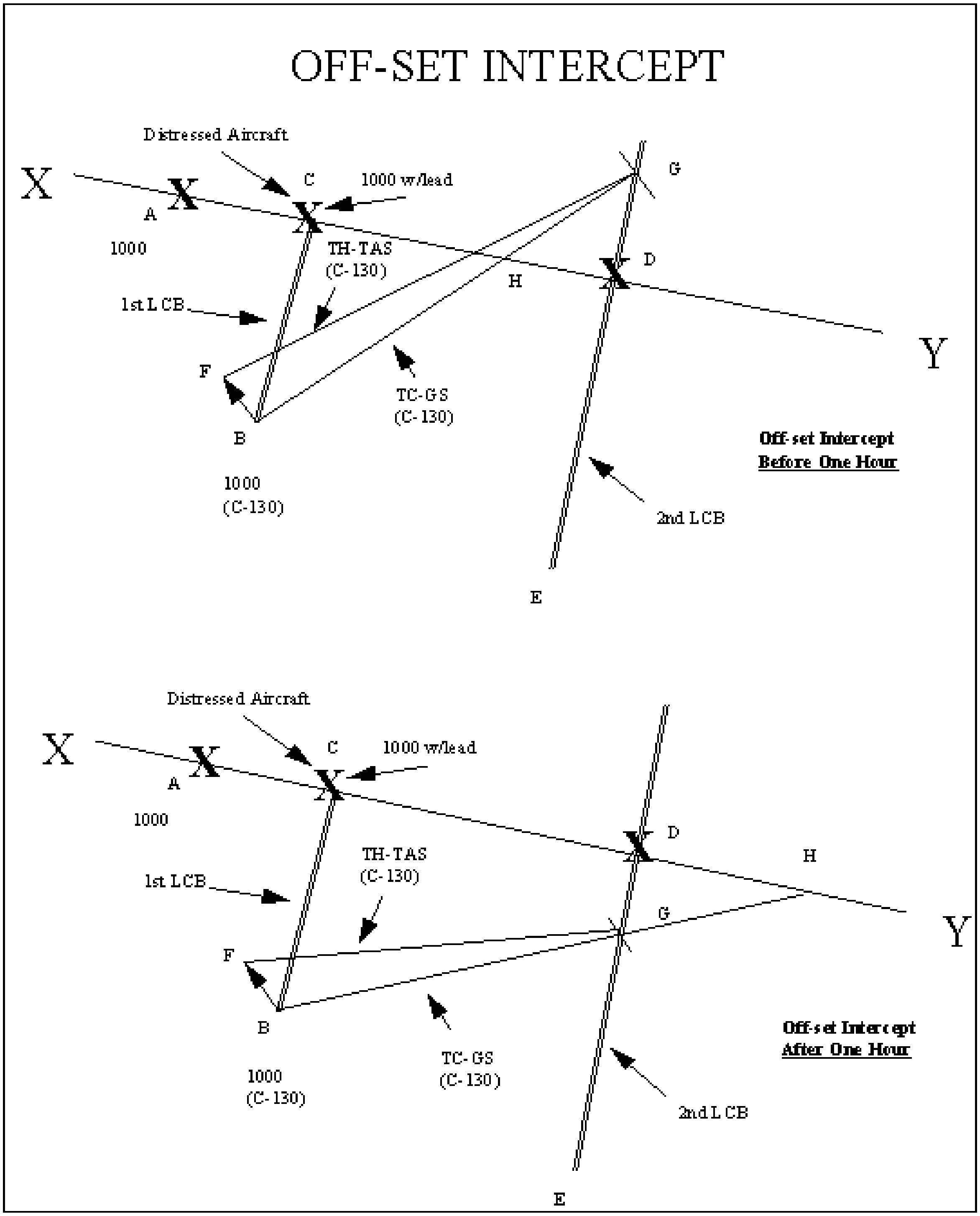


Figure 21.14. Lost Airplane Fixing.

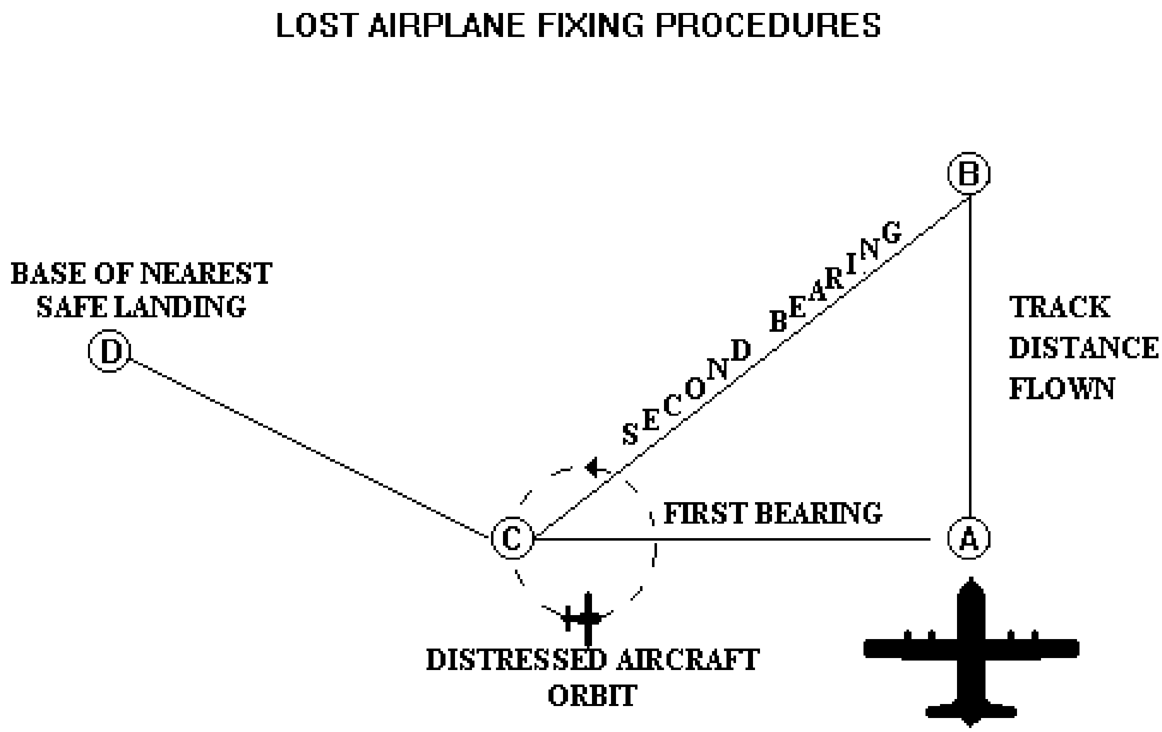


Figure 21.15. Wind and Sea Prediction Chart.

WIND VELOCITY (in knots)	HT OF WAVES (in feet)	BEAUFORT NUMBER	SEA INDICATIONS
Calm	0	0	Like a mirror.
1 - 3	1/2	1	Ripples with the appearance of scales.
4 - 6	1	2	Small wavelets; crests have glassy appearance.
7 - 10	2	3	Large wavelets; crests begin to break; scattered whitecaps.
11 - 16	5	4	Small waves, becoming longer. Fairly frequent whitecaps.
17 - 3.	10	5	Moderate waves, taking a pronounced long form; many whitecaps.
22 - 27	15	6	Large waves begin to form; white foam crests more extensive; some spray.
28 - 33	20	7	Sea heaps up, white foam from breaking waves blown in streaks along direction of waves.
34 - 40	25	8	Moderately high waves of greater length; crests break into spindrift; foam blown in well marked streaks in direction of wind.
41 - 47	30	9	High waves. Dense streaks of foam; sea begins to roll; spray affects visibility.
48 - 55	35	10	Very high waves with overhanging crests foam in great patches blown in dense white streaks. Whole surface of sea takes on a white appearance. Visibility affected.

NOTE: The difference in wind at 2,000 feet from the surface winds over relatively smooth water is as great as 20 - 30 degrees in direction and 50 percent in velocity. Take into account when computing surface winds.

Chapter 22

EMERGENCY NUCLEAR AIRLIFT (ENAF)

Section 22A— Mission Preparation

22.1. Introduction. Use this chapter when airlifting nuclear weapons during an emergency. It is applicable to all active duty units.

22.2. Emergency Nuclear Airlift. You may be tasked at any time to airlift nuclear weapons. You could be diverted while enroute or be tasked as part of a large scale OPLAN to evacuate or resupply an entire theater. The amount of preparation and assistance you receive will depend entirely on the length of time the MAJCOM has to move the weapons.

22.3. Conduct of Operations. You should be briefed on and receive detailed instructions from a specific OPLAN or mission directive. If there is a conflict between this instructionand the irequirements in an OPLAN or mission directive, use the OPLAN or mission directive.

22.4. Emergency Nuclear Airlift Standards. In an emergency, the objective is to move weapons safely in a short time. You are expected to use sound judgment and common sense in what may be a turbulent or tense environment. Pay particular attention to the following areas:

22.4.1. Nuclear weapons must be handled safely. The most immediate hazard is the high explosive that can be set off by shock or heat in most nuclear weapons. Use standard aircraft Dash 9 loading procedures. Keep the loading controlled and orderly at all times. Load or handle only one item or pallet at a time. You may ask shipper or receiver personnel to help, but the overall aircraft loading responsibility still belongs to the aircrew. Time permitting, you may refer to T.O. 1C-130E-16-1 or 16-2, section I, II, III, or IV, for specific instructions that could help you during onload or offload. Step-by-step use of the Dash 16 is not necessary.

22.4.2. Load plan:

22.4.2.1. If you are required to move the maximum number of one type of weapon, section VI of the Dash 16-1 is the best guide to determine where to position the weapons. Use the maximum tested Figure.

22.4.2.2. For mixed loads (more than one type of weapon), base the load plan on how many weapons can be properly restrained using Dash 9 criteria. Do not allow weapons to rub or touch each other when tied down.

22.4.2.3. You may use the Dash 9 to compute shoring requirements or section VI of the Dash 16-1, which shows parking and rolling shoring requirements for each weapon. For winching operations, the Dash 16 is a good guide for positioning approach shoring.

22.4.3. Use standard Dash 9 restraint criteria. The tie-down patterns in the Dash 16-1, which may exceed Dash 9 criteria, may be used. These patterns will aid in floor-planning a maximum tested load.

22.4.4. The route of flight must not violate restrictions in the USAF Special Weapons Overflight Guide (SWOG). Overflying a foreign country with nuclear weapons is an extremely sensitive issue, even in an emergency airlift. Comply with the SWOG at all times. If the SWOG is not accessible, request a route of flight that complies with the SWOG through C2 channels. The C2 center must ensure the route of flight is provided to the aircrew by the most expeditious means available. If no route of flight is provided, fly normal ATC routings to the destination. Do not divulge the nature of cargo to any enroute ATC facility or country to obtain a specific clearance.

22.4.5. United States military custody of nuclear weapons is required. Normally, the copilot is the courier who has custody of the nuclear cargo for the flight. Under certain conditions, the shipper may furnish United States military couriers who will retain custody of the weapons in flight. See paragraph **22.10.** below for custody procedures.

22.5. Aircrew Selection. All active duty C-130 aircrews (except 374 AW and 517 AS crews) may be used for ENAF. Time permitting, the controlling agency will use a sliding scale of options, which may be one or more of the following:

22.5.1. Assign prime nuclear airlift force (PNAF) loadmasters (LM) and pilots so as to have one or the other on each aircraft.

22.5.2. Place PNAF pilot and LM teams at the onload base to assist with the loads and flight plans.

22.5.3. Use non-PNAF crews in a prepared OPLAN scenario with preplanned, organized loads.

22.5.4. Use non-PNAF crews in a short notice, bare-base environment with little or no advance preparation or assistance.

22.6. Aircrew Requirements.

22.6.1. Crew complement will be according to the OPLAN or specific mission directive. If not specified, use a normal crew complement (basic crew, only one LM required).

22.6.2. You may be issued sidearms depending on the circumstances. If specific arming requirements are not in the OPLAN or mission directive, the airlift managers directing and controlling the airlift will determine which crew positions, if any, will be armed. (See **Chapter 7** for arming authority and procedures). If the aircrew must assume custody of the nuclear weapons, the courier officer should be armed.

22.6.3. If you are tasked for a mission that has a higher security classification than your personal security clearance, you will be authorized emergency access to enough information to complete the mission. (See AFI 31-501.)

22.7. Aircrew Briefings.

22.7.1. You should be briefed on the following:

22.7.1.1. Purpose of the mission.

22.7.1.2. Classification of the mission, cargo, and locations.

22.7.1.3. Itinerary (including confirmation of prior coordination for hazardous material as required by the IFR supplement) and alternate airfields.

22.7.1.4. Cargo (Line numbers from TO 11N-20-11 should be included. If not, attempt to obtain them from the fire department before starting the onload.) (TO 11N-20-11 is a classified TO that assigns an unclassified line number to each nuclear weapon.)

22.7.1.5. "No-lone zone," two-person concept, and security requirements.

22.7.1.6. Personnel authorized to sign for nuclear weapons at the destination.

22.7.1.7. Current intelligence, including threat analysis.

22.7.1.8. SWOG route of flight restrictions.

22.7.1.9. Airborne intercept (SWOG).

22.7.1.10. Jettisoning (SWOG).

22.7.2. The AC will ensure emergency procedures in paragraph **22.12.** below are briefed.

22.8. Emergency Mission Kit.

22.8.1. The emergency mission kit is a set of unclassified technical orders that are part of the aircrew trip kit. They are:

22.8.1.1. TO 1C-130E-16-1, *Loading and Air Transport of Nuclear Weapon Cargo (Nonpalletized*). Section VI, Emergency Logistic Movement Procedures, has tables of maximum tested loads and load plans for each item.

22.8.1.2. TO 1C-130E-16-2, *Loading and Air Transport of Nuclear Weapon Cargo (Palletized)*. Section VI has tables that list the number of items for each pallet, shoring (under wheel or under frame), maximum tested load, pallet overhang, and comments for each item. The comments will refer you to an appropriate figure if off-pallet tiedowns are required.

22.8.2. The Dash 16 is basically an amplification of the Dash 9. You may use any or all of the portions of the Dash 16 and be in compliance with Dash 9.

22.8.3. The emergency mission kit may contain a nuclear weapons template kit. The template kit consists of six plastic templates (five weapon and one shoring) in a vinyl plastic pouch designed for a 2-, 3-, or 5-ring binder. It may be placed in the binder with TO 1C-130E-16-1. The templates are designed for use with AF Form 4137, **C-130 Nuclear Floor Plan Worksheet**. Include five copies of AF Form 4137 in the mission kit.

Section 22B—Enroute Procedures

22.9. General. Use these procedures in addition to normal operating procedures in the rest of this instruction.

22.9.1. Flight Plans. Enter "Hazardous Cargo" and mission number in the "other information" section of the flight plan. If carrying inert weapons, trainers, or other items that may be mistaken for real weapons by crash and rescue personnel in an emergency, enter "Inert Devices."

22.9.2. Radio Calls.

22.9.2.1. Departure (Onload) Base. Before starting the onload, tell the tower to notify the fire department the onload is commencing. Prior to engine start, give the controlling agency (ground or tower) the parking location and approximate engine start time and announce there is hazardous cargo aboard the aircraft. Ensure a fire truck is standing by the aircraft for engine start.

22.9.2.2. Enroute or Offload Base. At least 30 minutes prior to landing, contact one of the following: (i) base operations, (ii) command post, or (iii) control tower. Pass your mission number and verify the hazardous cargo information has been received. If the arrival base does not have the hazardous cargo information, request the following be relayed immediately to the crash or fire protection agency and other support agencies as appropriate:

22.9.2.2.1. Aircraft call sign, type, and mission number.

22.9.2.2.2. ETA.

22.9.2.2.3. Explosives hazard class or division (normally 1.1).

22.9.2.2.4. Net explosive weight (NEW).

22.9.2.2.5. Line numbers from TO 11N-20-11, if requested. If possible, obtain line numbers from the base fire department prior to starting the load at onload location.

22.9.2.2.6. A request for isolated parking and for security forces to meet the aircraft.

22.10. Custody of Nuclear Cargo. Appoint a copilot or navigator to be the courier officer. The courier officer is responsible for receipt, custody, security, safety, and delivery of nuclear weapons to authorized receivers.

22.10.1. Before accepting and loading nuclear weapons, the shipper briefs the crew (at least the AC, courier officer, and primary LM) on the nature and hazards of the cargo. If anyone on the crew does not get the briefing, give them the appropriate information before the flight. Ask the shipper to point out any specifics you may need to handle the weapon; i.e., tiedown points, forklift stirrups, command disable system (CDS) procedures, etc. The specific procedures in section II, III, and IV of the Dash 16 can also provide helpful information on how to load specific weapons.

22.10.2. Time permitting, the courier and LM will inspect the cargo before accepting custody. The courier should have the shipper verify the integrity of a weapons case and replace any broken seals. You may be held responsible for damage at the receiving end if you accept a damaged weapon without documentation. Document damage or broken seals on the DD Form 1911, **Materiel Courier Receipt**, prior to signing for the weapon.

22.10.3. The courier accepts custody of the weapon by signing the DD Form 1911 provided by the shipper. Use this form to transfer cargo custody to replacement couriers.

22.10.4. Release custody of the cargo only to a replacement courier or someone authorized to sign for nuclear material. Authorized receivers are identified by the shipper, by message, or through TACC or theater (as applicable) C2 system.

22.10.5. Time permitting, refer any questions to TACC or applicable C2 system using secure lines of communication.

22.11. Security Procedures. The host base is responsible for providing security for the aircraft and the nuclear cargo. The courier officer (who has custody of the weapons) is the final authority on security matters; however, you should follow the advice and procedures of the host security force as much as possible. If the situation is serious and you must load and depart quickly, use your judgment and dispense with the formalities. Prior to takeoff, the AC will ensure security support at stations being transited through the TACC or C2 system.

22.11.1. Home Station. Time permitting, conduct a thorough visual search of the aircraft for unauthorized explosives or stowaways. Use a bomb detection dog, if available. If time is critical, do not delay the mission to "sanitize" the aircraft.

22.11.2. Onload Base. The host base should set up a restricted area around the aircraft, normally with ropes and stanchions.

22.11.2.1. Entry Control. Use one entry point to maintain strict control of entry into the area. The entry controller will have a roster of all personnel allowed to enter. Use a copy of the flight orders for the aircrew. Instruct the entry controller to coordinate with the aircrew courier before allowing anyone into the area. (***EXCEPTION:*** Allow the weapons convoy to enter the restricted area without delay.)

22.11.2.2. "No lone zone." Do not allow anyone to be alone in the restricted area or aircraft when nuclear weapons are present (either inside the area or aircraft). The purpose of a "no lone zone" is to prevent any one person from tampering with a nuclear weapon. The easiest way to enforce a "no lone zone" is to always be in pairs inside the restricted area (for example, two aircrew members, two shippers, or one aircrew member and one shipper).

22.11.3. Inflight. Do not allow anyone to be alone in the cargo compartment.

22.11.4. Arrival or Enroute Base. As soon as the engines are shut down, deploy sufficient crewmembers around the aircraft to control access to the aircraft. Until the host base security force is established, the only personnel authorized near the aircraft are aircrew members and those support personnel necessary to install ground power and wheel chocks. Monitor these people at all times. Keep all doors closed and be prepared for an immediate departure until the host base establishes security.

22.12. Emergency Procedures.

22.12.1. Security Emergencies. If confronted with a hostile force, you may use deadly force to protect the nuclear cargo. You will resist to the fullest extent possible any attempt by a hostile force to capture a nuclear weapon. Consider any attack on an aircraft loaded with nuclear cargo, including a hijacking attempt, as an attack against the nuclear weapons. Should hostages be used to gain access to, as cover for removal, or to thwart recovery of a nuclear weapon, the welfare and safety of the hostages should be considered in determining actions to be taken. However, the presence of hostages shall not deter the taking of decisive, prompt, and effective action that includes the use of deadly force to recover a nuclear weapon and to prevent unauthorized access to or removal of a nuclear weapon. If you are attacked, take the following actions:

22.12.1.1. Make an immediate takeoff, with the cargo, if possible.

22.12.1.2. If the attack occurs during onloading or offloading, load the weapons as fast as possible even if improper procedures must be used. Ensure effective cargo restraint, and take off immediately.

22.12.1.3. Some weapons have a CDS that internally destroys the capability of a weapon to achieve a significant nuclear yield. The CDS will be used when capture of a weapon is imminent.

22.12.1.4. Aircrews will not use emergency destruct procedures on nuclear weapons. Emergency destruction (ED) of weapons by shaped charges requires Secretary of Defense (SECDEF) approval and will be accomplished by qualified personnel as a last resort. Turn the weapons over to properly identified US military shipper or receiver personnel, who have the capability to receive, authenticate and carry out ED orders. When two properly identified shipper or receiver personnel concurrently request custody of the cargo for ED purposes, release the cargo using appropriate custody transfer procedures.

22.12.2. Jettisoning Nuclear Cargo. The LM will identify which cargo is and is not jettisonable according to the Dash 1. In an emergency, the AC has a moral obligation to jettison cargo or crash land where the least amount of damage will result. Use the CDS, if applicable, prior to jettisoning or crash landing. Record the coordinates of each jettisoned item. Observe the jettison restrictions contained in the Air Force SWOG.

22.12.3. Landing in Foreign Countries. Use a great deal of prudence and keep things very low key. If confronted with demands to board or inspect the aircraft, reply on the status of military aircraft in the FCG, which states: "United States military aircraft are sovereign instrumentalities. When cleared to overfly or land in foreign territory, it is United States policy to assert that military aircraft are entitled to the privileges and immunities that customarily are accorded rescue ships. These privileges and immunities include, in the absence of stipulations to the contrary, exemption from duties and taxation; immunity from search, seizure, and inspections (including customs and safety inspections); or other exercise or jurisdiction by the host nation over the aircraft, personnel, equipment, or cargo on board. United States Air Force ACs will not authorize search, seizure, inspection, or similar exercises of jurisdiction enumerated above by foreign authorities except by direction of Air Force headquarters or the American Embassy in the country concerned." Diplomatically, but firmly, refuse any requests to board or inspect, and get help through any available US channels. Flash priority is authorized.

22.13. Maintenance on Aircraft Loaded with Nuclear Cargo.

22.13.1. Maintenance on an aircraft loaded with nuclear weapons must not violate safety rules normally used with aircraft loaded with conventional explosives. As much as possible, have maintenance and servicing completed before loading the nuclear weapons on the aircraft. Do not allow maintenance that could increase the possibility of a fire, such as:

22.13.1.1. The use of flame or uncontrolled heat producing items.

22.13.1.2. Fuel system, cell and tank repairs, or other maintenance where significant fuel spills are likely to result from disconnected lines, ruptured components, etc.

22.13.2. Aircraft will not be jacked. The temporary lifting of one set of landing gear for minor maintenance (tire change, brake change, etc.) is not considered jacking.

22.13.3. Do not refuel, defuel, or service oxygen while loading or offloading nuclear weapons. Have a fire truck stand-by at the aircraft during refueling, defueling, or oxygen servicing.

22.13.4. The FE or crew chief will monitor all maintenance on the aircraft while nuclear cargo is on board.

Figure 22.1. Emergency Nuclear Airlift Operations Guide

EMERGENCY NUCLEAR AIRLIFT OPERATIONS GUIDE
This guide describes recommended actions for the courier and crew during emergency nuclear airlift operations. It is designed for those missions diverted en route to an onload site where the crew does not have the opportunity to receive a formal TALCE, home station or command post briefing. However, even if a formal briefing is given, this guide may be used as a refresher. Security, time, and ground support may not be sufficient to allow the use of this guide during emergency operations. In such cases, the courier and crew will have to assess all factors and use their judgment on the best course of action to accomplish the mission. Paramount in all decisions is the safety and security of nuclear cargo.
Prior to Onload (either at home station or en route to onload site):
Review crew responsibilities and the procedures to be used during the onload (loading method, security setup, cargo receipt, two-person concept). Do not discuss classified information over interphone.
If time permits, review the applicable section of the dash 16. The use of the Dash 16 is not mandatory; how ever, it may provide useful loading information for the cargo such as parking and rolling shoring requirements and tiedown patterns.
Enroute, 30 minutes prior to landing, contact the onload site and notify them of your ETA. Make support requirements known (fuel, MHE, transportation, security, etc.) at this time.
Arrival and Onload:
Contact the senior security official and request the following: (If you have nuclear cargo on board, keep everyone off the aircraft and provide security until the host security forces assume responsibility.)
A restricted area to be established around the aircraft. Ropes and stanchions are normally used to denote the restricted area. However, depending on the situation, you may see additional guards, security vehicles, fighting vehicles, etc., rather than ropes. Be flexible. The key is whether the host base is furnishing enough security to protect the nuclear cargo.
A single entry control point established.
The entry controller must allow only those individuals into the restricted area who have been cleared by the courier. Tell the entry controller which individuals are authorized into the area and time permitting, back it up in writing using crew orders, entry authorization lists (EAL), and prepared shipper lists.
While security is being established, contact the shipper and verify identification. After security is established, accomplish the following with the shipper:
NOTE: The shipper briefing and cargo inspection will be accomplished if time and the security environment permit it.
Shipper briefing to include:
Nature, hazard, and safety regarding shipment of the nuclear weapon cargo, including line numbers from TO 11N-20-11, DOT Class, DOD explosive hazard class or division, and net explosive weight (NEW).
Courier escort requirements.
Items requiring the two-person concept.
Items that are CDS-equipped and if the CDS has been activated (weapon not operational).
Items exposed to an abnormal environment or not operational.

Special handling or unique requirements particular to the cargo.

Individuals required to assist during the on load or offload. Pass the information to the entry controller.

Authorized recipients at offload station. Get this information in writing.

NOTE: If the primary LM and the AC were not present for the shipper briefing, the courier must brief them on the applicable items.

Cargo Inspection:

The primary LM, courier, and shipper will inspect the cargo for broken seals, exterior damage, security to carrier, wheel and casters, tiedown points, etc. If discrepancies are found, have the shipper annotate them on the DD Form 1911.

After the inspection, accept custody of the cargo by signing the DD Form 1911.

NOTE: Prior to accepting the cargo, ensure everything is ready for the onload.

During the onload or offload, monitor the operation, assist as necessary and ensure personnel comply with the two person concept.

Once the onload is complete and the crew is ready to start engines, deploy the courier team to maintain security and, when ready, tell the host base security to break down security and to maintain surveillance until departure.

NOTE: In some cases, crew complement and duties may preclude deployment of a complete courier team (courier and two LMs). In these cases, deploy as many personnel as possible without interfering with aircraft operations. Ensure they maintain surveillance of the immediate area during engine start (when feasible). When ready to start, have the courier, LM, or scanner direct security police to break down security and maintain surveillance of the aircraft. Monitor access to the crew entrance door during start, if possible.

Enroute to Offload:

Maintain the two-person concept.

Notify the controlling C2 center of your departure time and ETA at the offload station. Be prepared to encode this information.

If time permits, review the security and handling procedures to be used at the offload station. Do not discuss classified information over the interphone.

Contact the agency specified in flight information publications (FLIP) 30 minutes prior to landing (command post, base operations, or tower) and ask if they have your hazardous cargo information. If they don't, pass the following information:

Call sign, type aircraft, and mission number.

ETA

Line numbers from TO 11N-20-11 and DD Form 1911.

If you were not provided line numbers, then provide the following:

DOD explosive hazard class or division (normally 1. 1) or DOT Class (normally Class A). Net explosive weight (NEW)

A request for isolated parking and for their security forces to meet the aircraft.

Inert devices, if applicable.

NOTE: The shipper should give you the information for the last four items above.

Offload

Upon arrival, deploy the courier team and provide security until the host security forces assume responsibility and establish the restricted area. Ensure security is provided. Keep all doors closed and keep all ground personnel off the aircraft until security is established.

Maintain the two-person concept.

Brief the receiver on the cargo and transfer custody.

Briefing includes:

- Nature, hazard, and safety regarding shipment of the nuclear weapon cargo, including line numbers from TO 11N-20-11, DOT Class, DOD explosive hazard class or division, and NEW.
- Courier escort requirements.
- Items requiring two-person concept.
- Items that are CDS-equipped and if the CDS has been activated (weapon not operational)
- Items exposed to an abnormal environment or not operational.
- Special handling or unique requirements applicable to the cargo.
- Individuals required to assist during the offload. Pass this information to the entry controller.

The receiver and courier will conduct an inspection of the cargo for broken seals, exterior damage, etc. If discrepancies not previously noted are found, the courier will annotate them on the DD Form 1911.

Transfer custody of cargo. (Receiver signs DD Form 1911.) and Offload cargo.

Chapter 23

AIRCREW CHEMICAL OPERATIONS AND PROCEDURES

23.1. Wear of the Aircrew Chemical Defense Ensemble (ACDE). Wearing ACDE (includes the aircrew eye respirator protection [AERP] above-the-shoulder system and CWU-66P integrated aircrew chemical coverall [IACC]) will constrain normal aircraft operations. Procedures and equipment have been tested under restricted conditions, and "business as usual" will not be possible. Individual situations will dictate what can and cannot be done. To properly adapt, aircrews must understand hazards involved and the limitations of their chemical defense equipment.

23.1.1. This chapter is intended to enhance other aircrew chemical defense training and provide the crew member a basic understanding of utilizing ACDE in a chemical-biological threat area (CBTA). It combines information from technical orders and unit inputs to form a single source document.

23.1.2. This chapter briefly describes the nature of the chemical threat and agents that may be faced. Secondly, it discusses some of the situations and problems the aircrew may encounter in a chemical threat environment. Preparatory actions and countermeasures are examined so the crew member can make optimal use of the ACDE and fly the mission safely. While the information presented may need to be modified, the specific objectives of this chapter will help prepare the aircrew member for the unique challenges imposed by chemical weapons.

23.2. Factors Influencing the Chemical Warfare (CW) Agent Hazard.

23.2.1. General. The major instances in which a crew may be exposed to chemicals is through inhalation, absorption through the skin, eyes, and ingestion. Contaminated drink and food are considered harmful, but immediate concerns must be contamination avoidance to the maximum extent, limit exposure of the skin and eyes, as well as avoid breathing the contaminates. Factors affecting persistence are weather, agent physical characteristics, method of dissemination, droplet size, and the terrain.

23.2.2. Weather. Factors include temperature, wind, humidity, precipitation and atmospheric stability. For example, high winds and heavy rains reduce the contamination hazard. Conversely, lack of wind, overcast skies, and moderate temperatures favor persistence.

23.2.3. Agent Dissemination. Disseminated as vapors, aerosols, or liquids. Solids seem unlikely, but agents may become solids at lower temperature.

23.2.4. Agent Droplet Size. Persistence factor is determined by droplet size. Agents may be mixed with other chemicals ("thickeners"), and form large drops making removal more difficult.

23.2.5. Surface and Terrain. CW agent clouds tend to follow the terrain, flowing over countryside and down valleys. Chemicals persist in hollows, depressions, and other low areas. Rough terrain retards cloud movement. Flat countryside allows a uniform, unbroken cloud movement. Vegetated areas are more contaminated than barren terrain. Liquid agents soak into porous surfaces, making evaporation much slower than for non-porous surfaces.

23.3. Categories of CW Agents. CW agents having military significance may be categorized as nerve, blister, choking, and blood. Because they are produced biologically, toxins are technically not chemical agents. However, they are considered a potential CW threat.

23.4. Nerve Agents.

23.4.1. Military Significance. Nerve agents are the most lethal and fastest acting of the standard CW agents. These agents affect the nervous system and are highly toxic whether inhaled, ingested, or absorbed through the skin. Persistency ranges from hours to many days.

23.4.2. Symptoms of Exposure. Nerve agent exposure is difficult to distinguish. Symptoms include runny nose, tightness of the chest, difficulty breathing, excessive sweating, drooling, nausea, vomiting, diarrhea, and convulsions. Nerve agents can also cause muscular twitching, dimness of vision, and pinpointing of the pupils.

23.4.3. Onset of Symptoms. Inhalation produces symptoms within 1-2 minutes. The victim may be incapacitated within 5-10 minutes. Death may occur after several hours or days. Ingestion may cause the same symptoms, however, incapacitation may take longer. Nerve agents are retained by the body for an extended period; thus intermittent, cumulative exposure to low amounts can lead to the same ultimate effect as a single exposure to a higher amount.

23.4.4. Protection. The full protective ACDE is effective against nerve agents. When properly worn, the various chemical protective masks prevent inhalation of nerve agents and all layers of the outer garment must be protected against saturation of liquids, chemical agents, water, or petroleum.

23.4.5. Antidotes and Prophylaxis. Antidotes are effective in combating effects of nerve agent exposure. These antidotes may be effective if given to a victim having advanced symptoms, and as long as the victim is made to continue breathing. People who use the antidotes must be seen by medical personnel and may not be combat-ready for several days.

23.5. Blister Agents.

23.5.1. Military Significance. Blister agents are dispensed as vapors or liquids, and may be encountered as solids. These agents primarily affect the eyes, respiratory tract, and the skin.

23.5.2. Symptoms of Exposure. Placed on the skin, a drop the size of a pin head can produce a blister one inch in diameter. This action is accentuated by moisture; hence, a more severe danger is present during periods of sweating. The groin and armpits, which tend to be sweaty, are especially susceptible to blister agents. Blister agents that come in contact with the eyes lead to redness, watering of the eyes, blurring of vision, sensitivity to light, and, frequently, blindness. Inhalation causes serious damage due to burns and blisters to the mouth, nose, throat, and lungs. Incapacitation may last for days or weeks; aircrews will probably be unable to fly for indefinite periods. After hospitalization, complications from blister agent exposure can arise and may be fatal.

23.5.3. Onset of Symptoms. Blister agents are quickly absorbed through the skin. However, it usually takes several minutes (up to 5 minutes and as long as several hours) for the symptoms to appear. They act most rapidly in liquid form, but are also effective in vapor form.

23.5.4. Protection. The full ACDE is effective against blister agents. Exposed areas must be cleaned thoroughly immediately after exposure. Blister agents are easily transferred from contaminated surfaces; thus, great care must be taken to avoid contact with any contamination.

23.6. Choking Agents.

23.6.1. Military Significance. These agents are disseminated as vapors and when inhaled affect the respiratory system by damaging the lungs. Persistence is very brief, and they dissipate rapidly (within minutes) under most field conditions.

23.6.2. Symptoms of Exposure. Choking agents cause coughing, choking, tightness of the chest, nausea, headache, and watering of the eyes. Choking agents can be lethal, with death normally from the lungs filling with fluids, making breathing difficult or impossible.

23.6.3. Onset of Symptoms. Exposure to choking agents has an immediate effect. Victims experience slightly delayed effects, such as painful cough, breathing discomfort, and fatigue.

23.6.4. Protection. Both the aircrew and ground crew protective mask is extremely essential to protect against exposure; the entire protective ACDE should be used as directed.

23.7. Blood Agents.

23.7.1. Military Significance. Blood agents are usually dispensed as vapor or aerosol and inhaled. Under most field conditions they may briefly persist on target (up to 10 minutes).

23.7.2. Symptoms of Exposure. Exposure to a single breath of blood agent causes giddiness, headaches, confusion, and nausea. As dose increases, breathing becomes more difficult. The victim will have deep, uncontrollable breathing and cramps, then loss of consciousness. Death is certain if the victim receives no medical aid.

23.7.3. Protection. Blood agents are breathing hazards. The full ACDE is most effective because the mask provides the breathing protection needed.

23.7.4. Additional Threats. Blood agents will damage mask filters. All personnel must change mask filters at the earliest possible opportunity after a blood agent attack. ***EXCEPTION*****:** Filters installed in aircrew CWU-80/P filter packs will be removed and replaced by life support personnel (AFSC 1T1X1).

23.8. Aircrew Operations. Performance of duties while wearing the ACDE can be extremely physically and mentally demanding. Special preparation and crew coordination are required to operate under chemical conditions. The information presented here will enable the aircrew to successfully operate in a chemical environment by recognizing limits and exploiting the capabilities of the chemical defensive equipment. Consider the following factors:

23.8.1. Non-flying Ground Operations. Ground operations can represent the highest threat to aircrew safety. Protection from enemy attacks and exposure to liquid chemical agents is paramount. Aircrews should be advised to limit activities to essential duties only, and to separate ground duties from air duties. The ground ensemble is designed for quick donning and heavier levels of concentrations that can be more evident during ground operations. The aircrew ensemble is designed for light concentration levels that could be found during flying operations and transiting to and from the aircraft. Also, ACDE requires care during donning using "buddy dressing" procedures and life support expertise during aircrew contamination control area (ACCA) processing.

23.8.2. Equipment Limitations. Due to thermal stress and the degraded performance associated with wearing of the ACDE, it is highly desirable to minimize the time and number of personnel exposed to chemical agents. Aircrew members must be familiar with the limitations of the ACDE and properly plan their duties. ACDE is designed to protect against vapor agents only and the mask and hood assembly can not be donned quickly in time of attack.

23.8.3. Body Temperature and Fluids Control. Heat stress and dehydration are serious hazards while wearing the ACDE. Aircrew members need to control perspiration rates and limit activities to essential duties only. The need to consciously slow the work pace while performing physical labor, share workloads and monitor each other's physiological condition is essential.

23.8.4. Breathing Restrictions. One of the inherent design characteristics of the filter assembly is moderate breathing resistance. Normally, this is not noticeable except during high flow rates. For example during physical exertion, users should be aware of the possibility of hyperventilation. During flying operations resistance can be reduced by using the EMERGENCY position on the oxygen regulator. The val-salva maneuver cannot be performed while wearing the MBU-13/P mask. Alternate means such as yawning or chewing can be used. If these are unsuccessful, attempt to clear ears by holding the oxygen regulator in the TEST MASK position and forcefully exhale or yell against the regulator pressure. The new AERP mask and hood assembly which incorporates a blower system presents less-than-moderate breathing resistance. However, in the event of a blower system failure, aircrews will experience an increase in breathing resistance.

23.8.5. Limited Dexterity. Wearing three pairs of gloves restrict dexterity; therefore, visual confirmation of switch selection and positioning become very important.

23.8.6. Restricted Communications. Normal communications are limited while wearing the chemical defense mask. Communications can be enhanced by using the mini-amplifier and speaker with the ACDE and some of the newer ground masks may be issued with a built-in amplifier. Otherwise, visual signals, the aircraft's public address system, and the aircraft's interphone system can be used to compensate.

23.8.7. Peripheral Visions Limits. The aircrew chemical defense mask may reduce peripheral vision as much as 15 percent.

23.8.8. Emergency Procedures. Wearing any of the chemical defense masks and filter assemblies impose several limitations:

23.8.9. The aircrew member will not be able to detect fumes from fuel, hydraulic fluid and oil.

23.8.10. Filter assembly will not protect the user against ammonia fumes and carbon monoxide gas.

23.8.11. Filter assembly will not be used without an oxygen source in an oxygen deficient atmosphere.

23.9. Limitations. Aircrews need to be mentally prepared to face the dangers of chemical weapons. Plans should be developed to limit aircrew exposure during enemy attacks and liquid agent contamination while engaged in non-flying activities. Flight planning must be thorough and ACs should emphasized chemical defensive operations during mission planning, hazards and countermeasures, plans for on-load and off-load in the event of a ground attack, and plans for the return leg in the event of a contaminated aircraft. Alternate scenario plans should also be considered in the event conditions change.

23.9.1. Fuel Requirements. Extra fuel may have to be carried to compensate for altitude restrictions as the result of chemical agent exposure. If the aircraft has contamination, follow procedures outlined in paragraph **23.16.**. If purging procedures are used, the aircraft will be unpressurized and, although the aircrew can use the aircraft oxygen systems, passengers wearing the ground chemical defense ensemble (GCDE) cannot. This restricts the aircraft cruise altitude and increases fuel requirements.

23.9.2. Oxygen Requirements. Operating into a CBTA will increase oxygen requirements. The aircrew may be required to rely on the ACDE mask and aircraft oxygen system to counter actual and suspected chemical contamination. Using the 100 percent oxygen setting offers the greatest protection in a contaminated environment. Appropriate oxygen reservoir levels must be planned to meet higher consumption rates. Use the aircraft Dash 1 charts to calculate the required reservoir levels.

23.10. ACDE Issue and Medical Pretreatment. Aircrews will be issued sized ACDE and GCDE at home station. Aircrews will ensure their ACDE and GCDE are available at all times while in a CBTA. During deployments, at least one ACDE and one GCDE will be issued to each crew member as directed by unit commander or the TACC (or applicable C2 agency). Life support technicians will prepare and issue mobility ACDE "D" bags for aircrew members (AFI 11-301, Chapter 5 and 7). Mobility processing personnel will issue GCDE "C" bags. Aircrew members will confirm the mobility bag contents and correct sizes. The local AMC C2 (or applicable C2 agency) will direct aircrews to undergo medical pretreatment for chemical exposure.

23.11. In a Chemical-Biological Threat Area (CBTA).

23.11.1. Establishing Threat Level. Aircrews should monitor C2 channels to ensure they receive the latest information concerning the destination's alarm condition. Diversion of AMC aircraft to alternate "clean" locations may be required, unless operational necessity dictates otherwise.

23.11.2. Protective Equipment Postures. The following uses U.S. forces alert signals to outline ACDE/GCDE procedures for flying personnel:

23.11.2.1. "ALL CLEAR" Attack is not probable. Notificationóverbal; removal of warning signs and flags. ACDE requirementsóequipment is issued, prepared for flying, and kept readily available. GCDE requirements equipment is issued and readily available.

23.11.2.2. "ALARM YELLOW" Attack is probable. Notificationóverbal; posting of yellow warning signs and flags. ACDE requirementsóif enroute to fly or during flying operations, all components will be worn except mask and hood, gloves, over-cape, and over-boots. Mask and hood will be immediately available. GCDE requirementsóappropriate components should be worn with the mask and hood and immediately available commensurate with ground duties.

23.11.2.3. "ALARM RED." Attack is imminent or in progress. Notificationóverbal; posting of red warning signs and flags; 1- minute warbling tone from sirens; succession of long blasts (3 seconds onó1 second off) from warning devices. ACDE requirementsófull ACDE will be worn for flying duties. GCDE requirementsófull GCDE should be worn commensurate with ground duties.

23.11.2.4. "ALARM BLACK." Contamination is suspected or present. Notificationóverbal; posting of black warning signs and flags; broken warbling tone from sirens; succession of short blasts (1 second onó1 second off) from warning devices. ACDE requirementsófull ACDE will be worn. GCDE requirementsófull GCDE will be worn commensurate with ground duties.

23.12. Donning Equipment. Aircrew will don ACDE based on the alarm condition. Use the "buddy dressing" procedures and refer to the appropriate Aircrew Chemical Defense Ensemble Size Card, or AMCVA 50-2, *ACDE Donning Checklist (Conventional and AERP)*, to ensure proper wear. When wearing the ACDE, Atropine and 2 PAM Chloride auto injectors will be kept in the upper left flight suit pocket. This standardized location will allow personnel to locate the medication should an individual be overcome by nerve agent poisoning. M-9 paper on the flight suit will facilitate detection of liquid chemical agents and ACCA processing. M-9 paper should be placed on the flight suit whenever entering a CBTA with a declared alarm condition of "yellow" or higher. When inbound to CBTA, prior to descent, the AC will ensure crew and passengers don appropriate protective equipment according to arrival destination's mission oriented protective posture (MOPP) level and brief aircrew operations in the CBTA. As a minimum, this briefing will include:

23.12.1. Flight deck isolation

23.12.2. Oxygen requirements

23.12.3. Air conditioning system requirements

23.12.4. CW clothing requirements

23.12.5. Ground operations and MOPP levels

23.13. Ground Operations.

23.13.1. Off and On Considerations. Extreme care must be exercised to prevent contamination of aircraft interiors during ground operations, particularly to the flight deck area. Reduce the number of personnel entering the aircraft. Contaminated engine covers, safety pins and chocks will not be placed in the aircraft unless sealed in clean plastic bags. Unloaded cargo will be protected prior to and while being transported to the aircraft. Protective covers will be removed just prior to placing the cargo on the aircraft. It is the user's responsibility to determine and decontaminate equipment in his or her charge. Aircrew members entering the aircraft will remove plastic over-boots and over-cape portions of the aircrew ACDE and ensure flight and mobility bags are free of contaminates and placed in clean plastic bags. Aircrew exiting aircraft into a chemical contaminated environment will don plastic over-boots and over-cape prior to leaving the aircraft.

23.13.2. Physiological Factors. ACs must be very sensitive to the problems resulting from physical exertion while wearing ACDE. The AC should consider factors such as ground time, temperature, and remaining mission requirements when determining on-load and off-load requirements. Individuals involved should be closely monitored for adverse physiological effects.

23.13.3. Communications. Conducting on-loading and off-loading operations while wearing the complete ACDE complicates communications capability. Use the mini-amplifier or speaker, aircraft public address systems, or aircraft interphone system. Augment with flashlight and hand signals as required.

23.13.4. Passengers and Patients. A path should be decontaminated between the aircraft and the ground transportation vehicle to reduce interior decontamination when loading and unloading passengers and patients.

23.14. Chemical Attack During Ground Operations. If an attack (condition red) occurs during on-loading and off-loading operations or transport to and from aircraft, take immediate cover away from the aircraft or vehicle. Follow "buddy dressing" procedures to ensure proper donning of ACDE prior to flight.

NOTE: Aircrews should don the ground crew protective chemical mask and protective helmet, consistent with circumstances and duties. Aircrews could be expected to forward information concerning medical aid, damage estimates, unexploded ordinance. Appropriate information may be sent via aircraft radios to the controlling agencies.

23.15. Crew Rest Procedures. Operational necessity may require the aircrew to rest or fly in a contaminated CBTA. If the mission is not being staged by another aircrew or preflight crews are not available, the aircrew will normally preflight, load, and secure the aircraft prior to entering crew rest. The departing aircrew will perform necessary crew preparations, and preflight briefings then report to the ACCA for processing with assistance from life support personnel who will assist aircrews donning ACDE prior to reassuming flying duties. If possible, aircrew transport should be provided in covered vehicle. Aircrews should avoid pre-flighting aircraft prior to departure to prevent contamination to themselves and the aircraft. As aircrews proceed to fly they will require assistance from ground support personnel in removing their aircrew protective over-cape and over-boots prior to entering the aircraft.

23.16. Outbound With Actual or Suspected Chemical Contamination-Venting Aircraft and Removing ACDE Components. With actual or suspected vapor contamination, the aircraft must be purged for two hours using Smoke and Fume Elimination procedures to eliminate the vapor hazard. To ensure no liquid contamination exists, a close inspection of aircrew, passengers, flight deck, passenger compartment, and cargo compartment will be conducted using M-8 and M-9 detection paper. Currently, vapors may be detected using the M-256 kit. Aircrews and passengers may remove their respective ensemble components if vapors have been purged and liquid agents are not detected on the flight deck or in the passenger compartment. If liquid contamination is present, the aircrew must take every precaution to prevent spreading them throughout the aircraft, especially on the flight deck. The best course is to identify actual or suspected contamination and physically avoid those areas for the remainder of the flight. Aircrews should attempt to maintain a total separation between the cargo compartment and the flight deck if the cargo area has liquid contamination. The environmental curtain should be fully installed and the cargo compartment kept as cool as possible (liquid agents are less volatile at lower temperatures). Personnel who have been contaminated with liquid agents will remain in their respective ensemble until processed through the applicable CCA.

23.17. Communicating Down-Line Support. Pass chemical contamination information through C2 channels when inbound. This information will be used to determine if a diversion flight is required. Report the physical condition of any crew or passengers who are showing chemical agent symptoms and whether they are wearing chemical defense ensembles.

23.18. After Landing Decontamination Procedures. Strategic aircraft returning from CBTA bases will be decontaminated at an island base or CONUS off-load station. Advise recovery base command post of suspected or actual chemical contamination. Decontamination will be done by the most expedient method. Aircrews will proceed to the ACCA for processing. Ground personnel will report to GCCA for processing. All personnel will remove protective clothing according to established procedures located in respective CCA.

NOTE: Because of the technical characteristics of life support and flying equipment and mission essential aircrew resources, an ACCA is required to ensure minimum exposure to contaminates. GCCAs are generally used to process ground crew personnel and typically are subject to potentially higher concentration levels. The ACCA is equipped and manned by trained life support personnel to process aircrews and decontaminate their equipment.

23.19. Work Degradation Factors. Work timetables need to be adjusted to minimize thermal stress caused by wearing the ACDE. Aircrews must weigh all factors when performing inflight and ground duties. **Table 23.1.** are degradation factors for wearing a full ground chemical ensemble, and may also be used to represent the task time multipliers for the ACDE. To estimate how much time it takes to perform a task or operation; (1) take the task time multiplier for the appropriate work rate and ambient air temperature, and (2) multiply it by the time it normally takes to perform the task. For example, given a heavy work rate and an air temperature of 70F, the crew member should expect a normal one hour task to take 2.1 hours while wearing ACDE.

Table 23.1. Work Degradation Factors.

WORK RATE	**TEMPERATURE**		
	20-49F	**50-84F**	**85-100F**
Light	1.2	1.4	1.5
Moderate	1.3	1.4	3.0
Heavy	1.7	2.1	5.0

Chapter 24

NIGHT VISION GOGGLES (NVG) OPERATIONS

24.1. General. This chapter provides guidance for C-130 NVG operations.

24.2. Mission. NVG crews will be capable of aerial delivery of personnel, equipment, and supplies into marked and unmarked DZs and/or infra-red (IR) ALZs. MAJCOMs will determine number and phase level of NVG certified aircrews.

24.3. Training/Operations. Aircrew training will be accomplished IAW AFI 11-2C-130V1. Four phases of NVG airdrop and airland training/certification provide a graduated NVG capability.

24.3.1. The following are the NVG phase level airdrop and airland capabilities/requirements.

24.3.1.1. NVG Phase 1 - Single ship or formation at night VMC altitudes no lower than 500 feet above the highest man-made obstacle or terrain feature and spot elevation or 400 feet plus one contour interval above the highest depicted basic terrain contour, whichever is higher, within five NM of centerline. Crews may airdrop on DZs marked with standard overt/covert lighting patterns.

24.3.1.2. NVG Phase 2 - Single ship or formation at night VMC altitudes no lower than 500 feet above the highest man-made obstacle or terrain feature and spot elevation or 400 feet plus one contour interval above the highest depicted basic terrain contour, whichever is higher, within three NM of centerline. Crews may airdrop on DZs marked non-standard overt/covert lighting patterns. Implementation of Phase 2 requires MAJCOM DO/XO approval.

24.3.1.3. NVG Phase 3 - Single ship or formation at night VMC altitudes no lower than 500 feet above the highest terrain feature/spot elevation or 400-feet plus one contour interval above the highest depicted basic terrain contour, whichever is higher, within 3 NM of route centerline. Segmenting legs is strongly encouraged. The crew must visually acquire and circumnavigate all obstructions (towers, antennas, etc.) by a safe distance during flight. If obstructions are not visually acquired, climb to arrive at an altitude of 500-feet above the obstruction height 2 NMs prior to the obstruction. Crews may airdrop on unmarked DZs. Implementation of Phase 3 requires MAJCOM DO/XO approval.

24.3.1.4. NVG Airland: Allows an NVG crew to fly airland missions wearing NVGs. NVG airland operations include NVG takeoffs, approaches, landings and taxi operations on IR-lit LZs. NVG airland requires OG/CC authorization. Implementation of NVG Phase IV requires MAJCOM DO approval.

NOTE: DZ and LZ markings/patterns are IAW AFI 13-217.

24.4. Mission Planning. One full day of planning for pilots and navigators is required for an NVG mission employing Phase 3 low-level altitudes, or an NVG airland mission (except for missions consisting of visual patterns only). For formation flights, the mission commander will determine who will plan the next day's mission. Route selection and mission planning techniques and procedures should incorporate strategies for enroute climbs and descents to optimize night terrain usage for threat avoidance. Using a 1000 fpm climb and planned ground speed is highly recommended for charted events enroute. A leg segment should not be less than 10 NMs in length to minimize unnecessary altitude changes.

24.4.1. Minimum required chart annotations are IAW **Chapter 17** of this AFI.

24.4.2. Weather minimums are IAW this instruction. NVGs have inherent limitations and weather conditions can reduce their effectiveness. Crews must seriously consider moon illumination and position, sky glow at dawn and dusk, cultural lighting, and weapon and expendable effects when planning NVG operations. Minimum weather requirements for NVG airland is 1500/3. NVG visual patterns require VMC.

24.4.3. The AC will ensure all aircrew members receive the pre-mission briefing contained in CL 6 (NVG Flight Crew Checklist).

24.5. Minimum Operational Equipment.

24.5.1. The following equipment is required for NVG operations:

24.5.1.1. ANVIS-6 NVGs or better. One per crew member plus one spare per crew. Spare batteries for each set.

NOTE: All crewmembers will preflight their NVGs prior to flight. The spare will be preflighted by the pilot. Minimum visual acuity is 20/45.

24.5.1.2. Aircrew helmets.

NOTE: Both pilots will wear the same type NVGs.

24.5.2. The following equipment must be operational for Phase III and IV (NVG airland missions):

24.5.2.1. Radar (Exception: Pilot proficiency).

24.5.2.2. Radar altimeter and repeater.

24.5.2.3. All landing and taxi lights (airland only).

24.5.2.4. SCNS.

24.6. Aircraft/Aircrew Preparation. Aircraft are normally configured for NVG operations prior to departure. In addition to the normal aircraft preflight, crewmembers have specific tasks to prepare the aircraft for NVG missions. Aircrews will use the NVG Light Masking Checklist at the end of this chapter. Emergency exit lights will be armed for all missions and may be taped for operational missions only. Additional equipment may be necessary to prepare the aircraft and crewmembers for missions that utilize NVG operations. Equipment which may be required include:

24.6.1. Aircraft Kit.

24.6.1.1. Canary Slides for planned ERO operations (airland only).

24.6.1.2. IR lenses for landing lights (airland only).

24.6.1.3. Blackout curtains and porthole covers.

24.6.1.4. NVG-compatible instrument panel floodlights.

24.6.1.5. Tape (olive drab).

24.6.1.6. NVG filters/film (if available).

24.6.1.7. Landing gear handle cover (if available).

24.6.2. Aircrew Kit.

24.6.2.1. NVG-compatible flashlights.

24.6.2.2. Personal lip/finger lights.

24.6.2.3. Chem lights (as required).

24.7. NVG Donning/Doffing Procedures.

24.7.1. Donning and doffing of NVGs will be initiated through the use of the Combat Entry/Exit Checklist or as briefed. Civil twilight may effect the donning and doffing times. If in formation, donning and doffing times will be determined in the formation briefing. Cease NVG usage early enough to regain adequate night visual acuity.

24.8. NVG Enroute Procedures.

24.8.1. Low-Level Restrictions. Flights should be planned and flown at the highest altitude commensurate with the threat.

24.8.1.1. Night VMC Altitude. Reference paragraph **24.3.1.**. for applicable enroute altitudes. If obstructions are not visually acquired, climb to arrive at an altitude of 500 feet above the obstruction height two miles prior to the obstruction.

24.8.1.2. Night VMC Drop Altitude. After slowdown when the DZ is in sight and will remain in sight or when a positive position is identified and adequate terrain clearance is assured, the aircraft may descend to drop altitude specified in AFI 11-231. The aircraft must be at or above drop altitude and stable not later than green light 2 minutes for jumpmaster-directed personnel airdrops, one minute for standard personnel airdrops, or green light for equipment and CDS airdrops.

24.8.1.3. MSA. Compute and fly MSA according to **Chapter 17** of this AFI. Loss of equipment specified in 24.5 also requires flying at MSA.

24.8.2. Altimeter Updates. Altimeter update points should be planned for each enroute portion of the mission. This involves the comparison of absolute altitude (radar altimeter) to the pressure altitude when flying over a body of water or flat terrain. Obtain an updated altimeter setting as close to the objective area as possible. If this is not possible, use the lowest forecast altimeter setting.

24.8.3. Combat Entry/Exit Checklists. The crew will accomplish the Combat Entry/Combat Exit Checklists according to **Chapter 17**.

24.9. NVG Airland Procedures. NVG airland operations includes NVG takeoffs, approaches, landings and ground operations on IR lighted ALZs.

24.9.1. Restrictions. Weather must be at least 1500/3. Only single-ship operations are authorized. NVG landings are not authorized in conjunction with instrument approaches (Exception: ARAs in VMC conditions).

24.9.2. Checklist Procedures. Normal checklists will be used. The pilot flying is responsible for initiating all checklists. The flight engineer is responsible for completing all checklists from the descent checklist through the after takeoff checklist. Crews may annotate the combat entry/exist checklist with "(RN)" and "(MN)" to denote both navigator responses.

24.9.3. Aircrew Requirements. Operations into IR-lighted ALZs are authorized for NVG airland certified aircrews only. Minimum crew requirements include pilot, copilot, map and radar navigator, flight engineer, and two loadmasters (one loadmaster if no airdrops or EROs are planned). The pilot, one navigator, and one loadmaster (unless only one loadmaster is required) will be instructors. Only highly qualified and experienced personnel will be selected to perform NVG airland operations. Integral crews should be designated and utilized whenever possible.

24.9.4. Emergency Procedures. Normal takeoff and landing emergency procedures will be thoroughly briefed, as well as actions to be taken in the event of NVG failure. See para. **24.14.** below for expanded guidance. Units will standardize the crew actions and coordination required to effectively and safely accomplish takeoff/landing emergencies.

24.9.5. Takeoff and Landing Requirements. Use the airfield marking pattern (IAW AFI 13-217) appropriate to runway conditions and the tactical situation.

24.9.5.1. The minimum runway required for takeoff is minimum field length for maximum effort takeoff (corrected for Vmca if necessary) or 3,500 feet, whichever is greater. The flight engineer will compute three-engine performance data using three-engine takeoff distance charts and have it available for the pilot's information. For wartime or contingency, the aircrew may use minimum field length for maximum effort takeoff (disregarding Vmca).

24.9.5.2. The minimum runway required for landing depends on the airfield marking pattern being used. For training purposes or peacetime, the minimum runway required is ground roll plus 1,000 feet (ground roll plus 1,500 feet for Amp 3.0) or 3,500 feet, whichever is greater. Compute ground roll using full brakes, two engines in ground idle, and two engines in reverse. For wartime or contingency operations, the minimum runway required for amp 2.5 is ground roll plus 1000 feet (ground roll plus 1500 for Amp 3.0), computed with four engines in reverse and full brakes.

24.9.5.3. Minimum runway width is 60 feet (19 meters).

24.9.5.4. Minimum taxiway width is 30 feet (9 meters).

24.9.6. Takeoff Procedures. Both pilots will wear NVGs for takeoff. At brake release, the pilot making the takeoff states: "Lights", the copilot turns on the IR landing lights. The copilot, during takeoff roll, calls out airspeed increases in 10 knot increments and calls "Go" at refusal speed. When the aircraft is in a definite climb, verified by the engineer and copilot, the copilot raises the gear on command of the pilot. If refusal speed is less than takeoff speed, the copilot will call "Go" at refusal speed, and "Rotate" at takeoff speed. The map navigator may remain standing during takeoff to verify terrain clearance. On departure, the radar navigator will call altitudes passing 50, 100, 150, 200 feet AGL. The flight engineer monitors engine instruments and warning lights and ensures the exterior lighting is set.

NOTE: Do not use landing lights for more than two minutes on the ground with IR lens covers installed.

24.9.7. Approach and Landing Procedures.

24.9.7.1. General. Both pilots will wear NVGs during approaches and landings. All crewmembers must place special emphasis on airspeed control, rate of descent, AGL altitude, and distance from the runway. At the discretion of the pilot in command, the following interphone calls will be made. Copilots update airspeed and rate of descent ("107 KIAS, 600 FPM"), followed by the radar navigator updates of the AGL altitude and distance to the runway ("400 AGL, 2.5 NM"). IR filtered landing lights must be used for landings. IR landing lights should be turned on 1 minute prior to landing. IR landing lights may be turned off after landing when at a safe taxi speed (approximately 60 knots).

24.9.7.2. Visual Approaches. The tactical situation will determine the type of visual approach used. For visual approaches the pilot, in coordination with the radar navigator, is responsible for slowing and configuring the aircraft for landing. Threat permitting, ARAs may be used to assist the pilot in LZ acquisition, approach and landing. When accomplishing visual approaches, all crewmembers will ensure terrain/obstacle clearance by any means available. The copilot must ensure that all checklists are completed and the landing lights are turned on prior to landing (indicates gear down to LZ party). The map navigator may remain standing during approach and landing to verify terrain clearance and assist in runway alignment.

24.9.7.3. Airborne Radar Approaches. Threat permitting, normal slowdown is 10 NM prior to runway threshold. Radar navigator will give a 30-second and 5-second preparatory call. At slowdown, the pilot will slow to 140 KIAS, or approach speed, whichever is greater, and configure the aircraft with 50 percent flaps and gear down. At approximately 5 NM to go, the radar navigator will state "Slow to threshold speed now." The pilot will state "Flaps 100 percent" and slow to maximum effort threshold speed. At glide slope intercept, the radar navigator will state "Begin descent now." At 1 minute prior to landing, the radar navigator will state "Crew, one minute advisory--Lights." The copilot, with concurrence of the pilot, will turn on the landing lights (indicates gear down to LZ party).

24.9.8. Go-Around and Departure Procedures. Whether maneuvering for another approach or proceeding with the route, plan to fly no lower than operational requirements dictate, but in no case no lower than enroute or pattern altitude.

CAUTION: Pilots are more susceptible to spatial disorientation during NVG go-arounds and departures.

24.9.9. Ground Operations. Loadmasters will use NVGs during EROs and Combat Offloads if mission dictates. The primary loadmaster is responsible for the safe loading and off loading of the aircraft. Follow the abbreviated checklist contained in annexes A and B of this instruction for use during actual operations.

24.9.10. Setting Radar Altimeters. Radar altimeters should remain set at enroute altitude setting until the slowdown. Once the approach is initiated, the radar altimeter may be reset to assist in NVG landing.

24.9.11. Weather requirements for NVG airland operations is 1500/3.

24.9.12. Touch-and-Go landings on NVGs are prohibited.

24.9.13. ALZ Control. IAW AFI 13-217.

24.10. NVG Airdrop Procedures. NVG airdrop includes operations into unmarked drop zones. Mission requirements will dictate the release method used. Follow checklists and procedures in **Chapter 19.**

NOTE: On airdrop missions composed of an NVG airland, the radar navigator is responsible for initiating all tactical checklists.

24.10.1. Loadmasters will use NVGs during airdrops if the mission dictates. Loadmasters on NVGs are not required to use their visors during airdrops. Consider cargo compartment lighting prior to opening ramp and door to minimize interference with wingman's NVG vision.

24.10.2. Emergency Procedures. Aircrews will follow emergency procedures and checklists as described in **Chapter 19**. Crews will review and coordinate NVG failure procedures for all phases of the mission. See paragraph **24.14.** below for expanded guidance.

24.10.3. Formation Procedures. Use procedures in **Chapter 18**.

24.11. NVG Formation External Lighting Procedures. Formation NVG lighting will be IAW the following NVG Exterior Lighting Checklist.

24.11.1. NVG Formation Exterior Lighting Checklist. Use the checklist in **Table 24.1.**. for aircraft exterior lighting configurations during peacetime operations. Reduced light, or light-out operations during peacetime must be conducted in warning or restricted areas IAW AFI 11-202V2. During combat/contingency operations, the tactical situation may dictate the use of all, some, or none of the aircraft exterior lights.

WARNING: Immediately discontinue use of NVGs, or increase spacing from preceding aircraft (if possible), when exterior lights in a preceding aircraft create excessive distractions or degrade performance of NVGs to the point where safe flying operations can not be maintained.

Table 24.1. NVG Formation Exterior Lighting.

COCKPIT CREW
1. Formation or Element Lead (unless last aircraft in formation) Navigation Lights: Steady, bright Strobe Inhibit: Low covert Formation Lights: On, medium Leading Edge Lights: Off
2. #2 Position Navigation Lights: Steady, bright Strobe Inhibit: Low Covert Formation Lights: On, medium Leading Edge Lights: Off
3. #3 Position/Last Aircraft in element Navigation Lights: Steady, bright Strobe Inhibit: Anti-collision (or high covert if illumination causes pilot distraction in follower aircraft) Formation Lights: On, medium Leading Edge Lights: Off
4. Last aircraft in formation (or single-ship): Navigation Lights: Steady, bright Strobe Inhibit: Off (or anti-collision if illumination causes pilot distraction) Formation Lights: On, high Leading edge lights: On

24.12. NVG Inadvertent Weather Penetration Procedures. If IMC conditions are encountered inadvertently, the crew will execute Inadvertent Weather Penetration Procedures as briefed and cease NVG usage.

24.13. NVG Rejoin Procedures. NVG formation rejoins will be IAW **Chapter 18** of this AFI. Formation rejoins will be no lower than night MSA. Coordinate for exterior lighting as required.

24.14. NVG Emergency Procedures. The non-flying pilot must be ready to immediately take the aircraft if the flying pilot experiences spatial disorientation or an NVG malfunction. During these phases of flight, the following procedures will be adhered to:

24.14.1. Enroute through Completion of Slowdown. For single-ship or as formation lead operations and either pilot's NVGs become inoperative, continue the route if appropriate (depending on which Phase mission altitudes are being flown). Otherwise maintain or initiate an immediate climb to at least MSA, transfer aircraft control to the other pilot if appropriate, and transition to a spare set. For formation wingman operations, maintain formation position if able, otherwise break out of formation, notify lead, and initiate a climb to at least MSA. Transfer aircraft control if appropriate and transition to a spare set. Maintain the MSA until the difficulty is overcome and continued safe low-level operations can be ensured. If the difficulty cannot be corrected, a break out will be accomplished.

24.14.2. Slowdown though Escape. For single-ship and formation lead operations, and either pilot's NVGs become inoperative, continue the airdrop if appropriate (depending on which Phase mission altitudes are being flown). If the DZ is in sight, the airdrop may be continued. For formation wingman operations, maintain formation position if able, otherwise breakout of formation, notify lead, and initiate a climb to at least MSA. Transfer aircraft control if appropriate and transition to a spare set. Maintain the MSA until the difficulty is overcome and continued safe low-level operations can be ensured. If the difficulty cannot be corrected a breakout will be accomplished.

24.14.3. NVG Approach, and Landing. If the pilot experiences NVG failure, or other malfunctions during takeoff and prior to refusal speed, takeoff may continue at the discretion of the pilot; otherwise an abort should be initiated. If the pilot or copilot experience NVG failure or other malfunctions prior to landing, perform a go-around. If the flight engineer experiences NVG failure or other malfunctions, land at the discretion of the AC. The other crewmembers must increase their clearing duties and confirm the zone is in sight. If either pilot's NVGs fail after takeoff, continue the climbout and follow the appropriate procedures for loss of NVGs. If the pilot's NVGs fail during landing rollout, the pilot will determine whether to go-around or continue to a full stop.

24.14.4. Formation Takeoffs, Approaches, and Landings are not authorized using NVGs.

24.15. NVG Light Masking Checklist (See Table 24.2.).

24.15.1. For aircraft without NVG compatible lighting use the following light masking checklist for NVG operations. This is not a challenge/response checklist, but is provided for reference in setting up the cockpit for NVG operations. Units may line out items on this checklist that do not apply to their aircraft.

WARNING: NVG compatible floodlights must be operational for NVG operations.

CAUTION: Care must be taken to not excessively tape some items, thus creating an increased hazard.

NOTE: Lights should be masked with olive drab tape or NVG compatible filters/film if available. Lights should be masked with sufficient layers of tape to prevent interference with the NVGs. Tape must be removed after flight to prevent damage to equipment and ensure compatibility for non-NVG flight.

NOTE: Spare pieces of tape will be available at each crew station for sealing light leaks, providing additional masking on lights, and masking Warning/Caution lights which illuminate in flight.

Table 24.2. NVG Light Masking Checklist.

COCKPIT LIGHT MASKING
I. CHECK/INSTALL THE FOLLOWING:
Blue Floodlights Installed
Unplug Approach Plate Holders
Flight Deck and Galley Curtain Installed (If available)
Extra Chem Lights Available
II. TAPE/INSTALL CHEM LIGHTS ON THE FOLLOWING:
Pilots Instrument/Side Panel
Jump Lights
Air Deflector Doors Light
ZM Mode Select Panel
SKE RFCI Panel
Master Door Warning Light
GPWS Lights
Electronic Fuel Correction Lights
Altitude Low Warning Light (NVG compatible film only)
SCNS Warning Lights
SKE CAUTION Light
CARA R/T Fail/Low Light
Autopilot OFF Light
Marker Beacon Light
FCS Annunciator Lights (Top/Bottom)
Beam Coupler Lights
Master Fire Warning/Rosebud Lights (for NVG airland operations only, use only one layer of olive drab tape)
Doppler Drift Angle-Ground Speed Indicator
Install Chem Lights on the ADI*, Airspeed Indicator*, Altimeter*, VVI*, HIS*, BDHI, RMI, and SKE Range Meter. (* - chem lights are mandatory)
Center Console/Instrument Panel
BETA Lights (Airland Only)
Oil Cooler Augmentation Lights (Airland Only)
ADS Open Light
MODE IV Caution Light
IFF Warning/Interrogation Lights
Install Chem Lights over top of the Engine Instrument Panel and forward of the Condition Levers.
Co-Pilots Instrument/Side Panel
Altitude Low Warning Light (NVG compatible film only)
GPWS/GCAS Lights
Nacelle Overheat/Rosebud Lights (for NVG airland operations only, use only one layer of olive drab tape)

SKE CAUTION Light Co-Pilots ADI Repeat Light Landing Gear Handle FCS Annunciator Lights (Top/Bottom) SCNS Warning Lights SKE Antenna Lights KY58/KY75/ and VT Lights
Co-Pilots Instrument/Side Panel
SKE Secondary Control Panel Jump Lights Air Deflector Doors Light Install Chem Lights on the ADI*, Airspeed Indicator*, Altimeter*, VVI*, HSI*, BDHI, RMI, SKE Range Meter, Cabin Altimeter, Flap Indicator and Bleed Air Pressure Gauge. (* - chem lights are mandatory)
Overhead Panel
Anti-Skid Test Lights (Airland Only) Anti-Ice/No-Ice Lights Fire Handles (for NVG airland operations only, use only one layer of olive drab tape) Install Chem Lights on the Pressure Controller, Cabin VVI, Cabin Differential Pressure, Fuel Quantity and Fuel Pressure Indicators
NAVIGATOR STATION
DFDR Light Defensive Systems Lights RADAR SKE FCI Control Panel CARA
CARGO COMPARTMENT (Option 1)
All Lights Dim White Overhead Center Lights Dim White Loading Lights OFF
CARGO COMPARTMENT (Option 2)
TAPE THE FOLLOWING Jump Lights Door Warning Lights
TURN OFF Floor Lights All Dome Lights Forward Center Aft

Ramp Under Flight Station Ramp Loading Lights Jump Platform Lights Ramp Door Uplock Inspection Lights Crew Entrance Door Light Wheel Well Lights Nose Main
INSTALL (as required) Green/Blue Chem Lights At Oxygen Regulators (3 Locations) At Ramp and Door Control At Static Line Retriever and CDS Switches Aft Anchor Line Arm Switches Blackout Curtains Window Curtains (Covers) On All Round Side Windows
NOTE: BREAK CHEM LIGHTS AND TURN OFF ALL NON-COMPATIBLE LIGHTS AT THE COMBAT ENTRY POINT

24.16. Amplified NVG Airland Checklist. All crewmembers should be familiar with all amplified checklist procedures in **Table 24.3.** before using the abbreviated checklist in AFI 11-2C-130V3 CL7.

Table 24.3. NVG AIRLAND CHECKLIST.

THRESHOLD CHECKLIST	
Note: At a minimum of 1.0 NM before the descent point, the navigator will initiate this checklist by stating, "**Slow to Threshold Now**."	
COCKPIT CREW	**LOADMASTER**
1. **"SLOW TO THRESHOLD NOW"** (RN/MN) 2. **"FLAPS - 100 PERCENT"** (P) ***NOTE:*** Slow to maximum effort threshold speed after lowering the flaps to 100 percent. 3. **"FLAPS ARE 100 PERCENT, LANDING GEAR IS DOWN"** (E) 4. **"RATE OF DESCENT IS _____ FPM, BEGIN DESCENT NOW"** (Just prior to the descent point) (RN/MN) 5. **"THRESHOLD CHECKS - COMPLETE"** (E)	
ONE - MINUTE ADVISORY	
One minute prior to actual touchdown time, the navigator will initiate this checklist by stating, "One - Minute Advisory, Lights."	
1. **"CREW, ONE - MINUTE ADVISORY, LIGHTS"** (RN/MN)	1. **"ONE MINUTE ADVISORY ACKNOWLEDGED LOADMASTER"** (LM)
2. **"ONE - MINUTE ADVISORY ACKNOWLEDGED LOADMASTER"** (LM)	2. Troop Commander - ALERTED
3. Landing Lights/IR Taxi Lights - **"SET"** (As Required) (CP/E)	3. Loadmasters - IN POSITION AND SECURED
NOTE: All T.O.1C-130X-1 checklist items must be complete before touchdown (i.e., radar stabilization).	4. Advise Troop Commander - **"PREPARE FOR LANDING"** (LM) On the navigator's 100 ft AGL call.

ON THE RUNWAY CHECKLIST

This checklist is designed for minimum ground time operations in lieu of the AFTER LANDING, BEFORE TAKEOFF, and LINEUP checklists. If the aircraft is required to remain on the ground for an extended period of time, the crew will run the complete AFTER LANDING, BEFORE TAKEOFF, and LINEUP checklists.

NOTE: After touchdown, the copilot calls out decreasing airspeeds in 10 knot increments (i.e., 90 knots, 80 knots, etc.) until a safe taxi speed is reached.	1. At 80 knot call - LOWER RAMP TO ADS POSITION AND OPEN DOOR
COCKPIT CREW	**LOADMASTER**
	WARNING: Prior to opening the ramp and door, canary slides/ground loading ramps will be restrained for landing using 1/2 inch tubular nylon or greater or 5000 lbs. strap. This restraint will remain in place and secure until the pilot gives the command "Cleared to Offload/Onload."
1. **"CLEARED TO OFFLOAD/ONLOAD"** (P)	2. On Pilot's Command **"CLEARED TO OFFLOAD/ONLOAD"** - LOWER RAMP TO BRIEFED POSITION.
NOTE: Clear the loadmaster to offload after the aircraft is completely stopped.	3. Canary Slides/Ground Loading Ramps - POSITIONED (As Required)
2. Radar - **"STANDBY"** (RN)	4. Offload/Onload - COMPLETE
3. Flaps - **"UP/50 PERCENT"** (As Required) (CP) (E)	***NOTE:*** Use appropriate procedures for the type offload/onload being conducted.
4. Unnecessary Equipment - **"SET"** (As Required) (CP) (P) (RN)	5. Outside Aircraft Checked for Dropped Objects - COMPLETE
5. Electrical Panel - SET (As Required) (E)	6. Canary Slides/Ground Loading Ramps - UP/SECURED (As Required)
6. Anti-Icing Panel - SET (As Required) (E)	
7. Exterior Lights - SET (As Required) (E)	
8. Notify Pilot - **"PILOT - LOADMASTER, CLEARED TO TAXI"** (When Ramp Reaches ADS Position) (LM)	7. Notify Pilot - **"PILOT - LOADMASTER, CLEARED TO TAXI"** (When Ramp Reaches ADS Position) (LM)
9. Flaps - **"50 PERCENT"** (CP) (E)	
10. Trim Tabs - **"SET"** (CP) (E)	
11. Takeoff Data - **"CHECKED"** (P) (CP) (E)	
12. Radar Altimeter - **"SET, STATE SETTING"** (P) (RN)	
13. Exists and Warning Lights - **"CLOSED, CHECKED LOADMASTER"** (LM) **"CHECKED ENGINEER"** (E)	8. Exists and Warning Lights - **"CLOSED, CHECKED LOADMASTER"** (LM)
13.1 Windows - CLOSED (E)	
13.2 Hatches - SECURED (E)	
13.3 Warning Lights - CHECKED (E)	9. Loadmasters - IN POSITION AND SECURED
14. Radar - **"SET"** (RN)	
15. **"LOADMASTERS READY FOR TAKEOFF"** (LM)	10. **"LOADMASTERS READY FOR TAKEOFF"** (LM)
16. Electrical Panel - SET (E)	
17. Anti-Icing Panel - SET (E)	
18. Exterior Lights - SET (As Required) (E)	
19. Throttles - **"CHECKED"** (E) - **"ROLLING "** (P)	

NOTE: When ready for takeoff, the pilot will advance engines to maximum power prior to brake release. Upon observing all engine instruments within limits, and all warning lights out, the flight engineer will call "CHECKED." At brake release, the pilot will call "ROLLING." The copilot will ensure the landing lights are set as required when the pilot releases the brakes.

Chapter 25

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25.1. This chapter is not used for C-130 operations.

Chapter 26

MODULAR AIRBORNE FIRE FIGHTING SYSTEM (MAFFS)

26.1. General. The Modular Airborne Fire Fighting System (MAFFS) consists of palletized tanks with a pressurized dispensing module which can be loaded on any C-130 aircraft equipped with the 463L dual rail cargo handling system. When activated, MAFFS equipped aircraft will be employed in support of the US Forest Service (USFS), or State Forestry Departments to control forest/wild land fires. Activation procedures for federal activations (USFS) will be IAW CINCAMC Phoenix Forest. State activations (ANG units only) will be IAW individual state operating agreements.

26.2. Air Force Mission Commander (AFMC). An AFMC will be selected for all MAFFS activations. The military unit responsible to provide the AFMC will normally be identified in the initial MAFFS activation message The AFMC is the primary point of contact between the military and the MAFFS Liaison Officer (MLO) The AFMC is the single person in charge of all military activities, equipment, and personnel (including air technicians assigned to MAFFS duties), and has final authority on all issues involving the military. The AFMC also has tactical control of all MAFFS missions. The MLO (federal or state) is single point of contact for all other (non-military) agencies. The AFMC will not act as a primary crew member on MAFFS airdrop missions.

26.3. Servicing Pit Procedures. Servicing pit assignments, takeoff sequencing, marshaling and parking instructions will be directed by the AFMC. Due to ramp congestion during MAFFS flight operations, shut down outboard engines prior to entering the pit servicing area. Normally, do not start outboard engines until reaching an uncongested area clear of the pit servicing area. In this case complete the “Starting Engines” and “Taxi” checklist prior to initiating the “Before Takeoff” checklist.

26.3.1. Pit Operations:

26.3.1.1. A specific individual will be designated as the servicing pit supervisor for each operating pit. The pit supervisor will be easily identifiable by wearing high visibility vest. His/her duties will include, the following:

26.3.1.1.1. Marshall aircraft into the pit.

26.3.1.1.2. Be stationed in front of the aircraft to act as a safety observer/refueling supervisor.

26.3.1.1.3. Communicate with the aircraft via intercom cord plugged into the external jack.

26.3.1.1.4. Clear the GTC/APU and propellers during the start.

26.3.1.1.5. Normally, close crew entrance door.

26.3.1.2. Aircraft will be chocked while being serviced in the pit. A set of aircraft chocks will be available in each pit.

26.3.1.3. Fuel servicing will be under the direction of the servicing supervisor. Concurrent servicing will be in accordance with T.O. 00-25-172 and AFOSH 127-39.

26.3.1.4. Aircraft fuel and retardant servicing with engines running is not authorized.

CAUTION: Depending on fuel load, the maneuver load factor may be exceeded with a full retardant load. Consult Section V of the appropriate flight manual for limitations.

26.3.1.5. Pit personnel will not approach the aircraft until the propellers have stopped turning.

26.3.1.6. External power will be used to the maximum extent possible during servicing operations.

26.3.1.7. After each MAFFS sortie, retardant buildup will be washed free using high pressure water. The aircraft will be thoroughly washed after the last sortie of the day.

26.4. Communications. USFS MAFFS FM radios will be installed in MAFFS aircraft. Procedures for operating the radio, if required, will be briefed by the MLO prior to employment missions. Additionally an FM radio operating manual is available from the MLO.

26.5. Tactics.

26.5.1. MAFFS airdrops will only be conducted during daylight hours, and planned to occur at or prior to official sunset. Daylight hours are defined as 30 minutes prior to sunrise, until 30 minutes after sunset. Recoveries may be accomplished after daylight hours. During federal activations all drops will be accomplished under the supervision of an Air Tanker Coordinator (Lead Plane). During state activations all drops will be accomplished IAW the current MOU between the military and respective State Department of Forestry. Normally, the USFS will provide an Air Tanker Coordinator to the state, if available.

26.5.2. Contact the lead plane (or Air Attack if lead plane is not on scene) approximately 5 minutes prior to arrival at the fire for sequencing and orbiting instructions. Remain clear of the fire and other air tankers until communications have been established. If contact cannot be made, attempt to contact the USFS dispatcher for further instructions; if unable, return to the tanker base.

26.5.3. The Air Attack Supervisor (if on-scene) or the Air Tanker Coordinator/Lead Plane will establish air traffic control over the fire, using the following criteria:

26.5.3.1. MAFFS aircraft may expect to enter a left-hand orbit over or near the fire. The Air Tanker Coordinator/Lead Plane will establish the orbit altitude and location.

26.5.3.2. The orbit point should allow air tankers to observe preceding drops.

26.5.3.3. Attack Supervisor (if on scene) will be at an altitude above the MAFFS aircraft.

26.5.3.4. The lead plane will remain below the air tanker orbit.

26.5.4. The Air Tanker Coordinator/Lead plane will:

26.5.4.1. Establish drop sequence and call for each tanker when ready.

26.5.4.2. Describe the target, drop objective, approach heading, altitude, and suggested escape route and will advise on hazards, altimeter setting, desired coverage level, and other pertinent factors.

26.5.4.2.1. Potential airdrop hazards are:

26.5.4.2.1.1. Reduced visibility from smoke, and shadows from reduced light.

26.5.4.2.1.2. Terrain.

26.5.4.2.1.3. Wind/turbulence.

26.5.4.2.1.4. Trees/snags.

26.5.4.2.1.5. Increased air traffic.

26.5.4.3. Lead/supervise/direct MAFFS aircraft throughout the approach and airdrop and, if required, give the execution command over the release point.

26.5.4.4. Critique the airdrop (on target, short, right, etc.) if time and conditions permit.

26.5.5. Prior to descending from entry altitude, MAFFS pilots will ensure the “Slowdown” checklist is complete, and prior to commencing the actual drop approach ensure they both understand the target and escape route.

26.5.6. Ascending drops or escapes and daisy chain drops will not be made.

26.6. MAFFS Aircraft Performance Charts. Supplemental performance charts and instructions for determining climb performance in the MAFFS airdrop configuration are contained in Figures 26.1, 26.2, 26.3, 26.4, and 26.5.

WARNING: Aircraft climb performance is significantly reduced due to the high-drag configuration (ramp down and 100% flaps). Under certain density altitude conditions, no three-engine climb capability is available. Should maximum climb performance be desired, jettison retardant and obtain a clean configuration soon as possible.

26.7. Crew Duty and Crew Rest Limitations.

26.7.1. Maximum crew duty day is 12 hours for MAFFS missions. This means that no MAFFS drops will be conducted after 12 hours. However, the 12 hour crew day may be extended to 16 hours for recoveries, redeployments, etc.

26.7.2. A minimum of 12 hours crew rest is required.

26.7.3. Flight time will not be planned to exceed 8 hours per day.

26.7.4. Duty includes flight time, ground duty of any kind, and standby or alert status at any location. Deployment/redeployment is not considered as MAFFS duty.

26.7.5. Days off will be scheduled. During any 14 consecutive days, crewmembers shall be off duty for 2 full calendar days. Days off duty need not be consecutive.

26.7.6. Safety will not be compromised at any time. The AFMC, in conjunction with each individual AC, will terminate flying activities whenever crew fatigue or any other factor such as heat or visibility (shadows, smoke, etc.) is deemed unsafe to continue.

26.8. Authorizations. MAFFS aircraft may operate with aft cargo door open as follows:

26.8.1. Operate from pre-flight through slowdown with aft cargo door open and tubes extended at pilot’s discretion.

CAUTION: Ramp and door must be closed for landing to ensure structural integrity of the aircraft.

26.8.2. Keep cargo ramp up and locked, and tubes extended for takeoff.

26.9. Forms Prescribed . AF Form 4096, **Airdrop, Station Keeping Equipment (SKE)**; AF Form 4064, **C-130 Take-off and Landing Data**; AF Form 4063, **Mini C-130 TOLD Card**; AF From 4108, **C-130 Fuel Log**; AF Form 4062, **C-130 Stall Speed Card**; AF Form 4052, **Range Control Chart**; AF

Form 4116, **C-130 Flight Plan and Log**; AF Form 4093, **Pilot's Information**; 'AF Form 4135, **Pilot's Low Level Airdrop Plan** and AF Form 4137, **C-130 Nuclear Floor Plan Worksheet.**

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

AFPD 10-9, *Lead Operating Command Weapon Systems Management*

AFPD 10-21, *Air Mobility Lead Command Roles and Responsibilities*

AFPD 11-2, *Aircraft Rules and Procedures*

AFI 10-1101, *Operations Security*

AFI 10-403, *Deployment Planning*

AFI 10-801, *Assistance to Civilian Law Enforcement Agencies*

AFI 11-202V2, *Aircrew Standardization/Evaluation Program*

AFI 11-202V3, *General Flight Rules*

AFI 11-2C-130V1, *C-130 Aircrew Training*

AFI 11-209, *Air Force Participation in Aerial Events*

AFI 11-214, Aircrew and Weapons Director Procedures for Air Operations

AFI 11-215, *Flight Manuals Program (FMP)*

AFI 11-218, *Aircraft Operation and Movement on the Ground*

AFI 11-231, *Computed Air Release Point Procedures*

AFI 11-299, *Nuclear Airlift Operations*

AFI 11-301, *Aircrew Life Support (AlS) Program*

AFI 11-401, *Flight Management*

AFI 11-403, *Aerospace Physiological Training Program*

AFI 13-207, *Preventing and Resisting Piracy*

AFI 13-212V1, *Weapons Ranges*.

AFI 13-12V2, *Weapons Range Management*

AFI 13-12V3, *Hazardous Methodology and Weapon Safety Footprint*

AFI 13-217, *Assault Zone Procedures*.

AFI 21-101, *Maintenance Operations and Management Policy*

AFI 23-202, *Buying Petroleum Products and Other Supplies and Services Off-Station*

AFI 31-101V1, *Air Force Physical Security Program*

AFI 31-207, *Arming and Use of Force by Air Force Personnel*

AFI 31-401, *Information Security Program Management*

AFI 32-2001, *The Fire Protection Operations and Fire Prevention Program*

AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*

AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections*

AFI 41-312 Volume 1, *Aeromedical Evacuation Contingency Operations Training (AECOT) Standards--General*

AFI 48-104, *Medical and Agricultural Foreign and Domestic Quarantine Regulations for Vessels, Aircraft, and Other Transports of the Armed Forces (Joint)*

AFI 48-123, *Medical Examinations and Standards*

AFI 91-202, *The US Air Force Mishap Prevention Program*

AFI 91-204, *Safety Investigations and Reports*

AFJI 11-204, *Operating Procedures for Aircraft Carrying Hazardous Materials*

AFM 2-50, USA/USAF Doctrine for Joint Airborne and Tactical Airlift Operations

AFM 3-4, *Tactical Air Operations Tactical Airlift*

AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*

AFP 102-2 V1, *Joint Users Handbook - US Message Text Formats*

AFTTP 3-1V1 (S), *General Planning and Employment Considerations*

AFTTP 3-1V2 (S), *Threat Reference Guide and Countertactics*

AFTTP 3-1V25 (S), *Tactical Employment, C/HC-130*

AMCI 11-208, *Tanker/Airlift Operations*

AMCI 11-301, *Aircrew Life Support (ALS) Program*

AMCMAN 11-211 (S), *Tactical Employment*

AMCR 3-2V2 (S), *Threat Environment Concepts*

FLIP-*DoD Flight Information Publication*

FM 101-5-1, *Operational Terms and Symbols*

JCS Pub 1-02, *DoD Dictionary of Military and Associated Terms*

T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*

AMCP 55-25, *Airlift Tactical Operations Techniques*

USTRANSCOMR 200-3, *Intelligence Debriefing and Reporting*

Abbreviations and Acronyms

AC—Aircraft Commander

ACM—Additional Crew Member

AD—Airdrop

ADS—Aerial Delivery System

AE—Aeromedical Evacuation

AECM—Aeromedical Evacuation Crew Member

AFCS—Automatic Flight Control System

AFRC—Air Force Reserve Component

AGL—Above Ground Level

ALC—Aircrew Laptop Computer

AMC—Air Mobility Command

AMCC—Air Mobility Control Center

AOA—Angle of Attack

AP—Auto Pilot

APU—Auxiliary Power Unit

ATA—Actual Time of Arrival

ATC—Air Traffic Control

AUX—Auxiliary

BASH—Bird Aircraft Strike Hazard

BCN—Beacon

BDHI—Bearing Distance Heading Indicator

CAT I—Category I Approach

CAT II—Category II Approach

CARP—Computed Air Release Point

CB—Circuit Breaker

CDS—Container Delivery System

CFL—Critical Field Length

COMSEC—Communications Security

CVR—Cockpit Voice Recorder

C2IPS—Command and Control Information Processing System

DH—Decision Height

DME—Distance Measuring Equipment

DZ—Drop Zone

EDP—Earliest Descent Point

ERO—Engine Running On/Offload

ETA—Estimated Time of Arrival

ETE—Estimated Time En route

ETP—Equal Time Point

FAF—Final Approach Fix

FMC—Full Mission Capable

FOD—Foreign Object Damage

FPA—Flight Path Angle

G/S—Glide Slope

GMT—Greenwich Mean Time

GPS—Global Positioning System

GPWS—Ground Proximity Warning System

GS—Ground Speed

HAHO—High Altitude High Opening

HALO—High Altitude Low Opening

HARP—High Altitude Release Point

HDG—Heading

HE—Heavy Equipment

HF—High Frequency

HQ—Have Quick

IAS—Indicated Airspeed

ICAO—International Civil Aviation Organization

IFF—Identification Friend or Foe

IFR—Instrument Flight Rules

ILS—Instrument Landing System

INOP—Inoperative

INT—Intermediate Thrust

IP—Initial Point

KCAS—Knots Calibrated Airspeed

KIAS—Knots Indicated Airspeed

LAPES—Low Altitude Parachute Extraction System

LOC—Localizer

MDA—Minimum Descent Altitude

MWS—Missile Warning System

NM—Nautical Mile

OAT—Outside Air Temperature

PPI—Plan Position Indicator

RCR—Runway Condition Reading

RSC—Runway Surface Condition

SATCOM—Satellite Communications

SKE—Station Keeping Equipment

SPR—Single Point Refueling

TOT—Time Over Target

X-FEED—Crossfeed

XFER—Transfer

XMIT—Transmit

ZFW—Zero Fuel Weight

ZM—Zone Marker

Terms

Additional Crew Member.—Mobility aircrew members and authorized flight examiners possessing valid aeronautical orders who are authorized to accompany the normal crew complement required for that mission according to **Chapter 3**.

Aeromedical Evacuation.—Movement of patients under medical supervision between medical treatment facilities (MTFs) by air transportation.

Aeromedical Evacuation Coordination Center.—A coordination center, within the joint air operations center's airlift coordination cell, which monitors all activities related to aeromedical evacuation (AE) operation execution. It manages the medical aspects of the AE mission and serves as the net control station for AE communications. It coordinates medical requirements with airlift capability, assigns medical missions to the appropriate AE elements, and monitors patient movement activities. Also called AECC.

Aeromedical Evacuation Crew Member.—Qualified Flight Nurses (FN), Aeromedical Evacuation Technicians (AET), performing AE crew duties.

Aeromedical Evacuation Operations Officer (AEOO).—Also call AECC.Medical Service Corps (MSC) officer or medical administrative specialist or technician (AFSC 4A0X1) assigned to the AE system to perform duties outlined in applicable Air Force policy directives, instructions, 41-series handbooks, and this AFI.

Air Force Satellite Communication (AFSATCOM).—Satellite communications system capable of 75 bits per second (BPS) record message traffic.

Air Force Component Commander (AFCC).—In a unified, sub-unified, or joint task force command, the Air Force commander charged with the overall conduct of Air Force air operations.

Airlift.—Aircraft is considered to be performing airlift when manifested passengers or cargo are carried.

Air Mobility Control Center (AMCC).—Provides global coordination of tanker and airlift for AMC and operationally reports to the AMC TACC. Functions as the AMC agency that manages and directs ground support activities and controls aircraft and aircrews operating AMC strategic missions through overseas locations.

Air Mobility Element (AME).—The air mobility element is an extension of the Air Mobility Command Tanker Control Center deployed to a theater when requested by the geographic combatant commander. It coordinates strategic airlift operations with the theater airlift management system and collocates with the air operations center whenever possible. Also called AME.

Air Reserve Component (ARC).—Refers to Air National Guard and AFRC forces, both Associate and Unit Equipped.

Air Route Traffic Control Center (ARTCC).—The principal facility exercising en route control of aircraft operating under instrument flight rules within its area of jurisdiction. Approximately 26 such centers conver the United States and its possessions. Each has a communication capability to adjacent centers.

Air Traffic Control (ATC).—A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

Allowable Cabin Load (ACL). —The maximum payload that can be carried on an individual sortie.

Assault Landing Zone (ALZ).—A paved or semiprepared (unpaved) airfield used to conduct operations in an airfield environment similar to forward operating locations. ALZ runways are typically shorter and more narrow than standard runways.

Augmented Crew.—Basic aircrew supplemented by additional qualified aircrew members to permit inflight rest periods.

Bird Aircraft Strike Hazard (BASH).—An Air Force program designed to reduce the risk of bird strikes.

- Bird Watch Condition Low - Normal bird activity [as a guide, fewer than 5 large birds (waterfowl, raptors, gulls, etc.) or fewer than 15 small birds (terns, swallows, etc)] on and above the airfield with a low probability of hazard. Keep in mind a single bird in a critical location may elevate the Bird Watch Condition (BWC) to moderate or severe.
- Bird Watch Condition Moderate: - Increased bird population (approximately 5 to 15 large birds or 15 to 30 small birds) in locations that represent an increased potential for strike. Keep in mind a single bird in a critical location may elevate the BWC to moderate or severe.
- Bird Watch Condition Severe - High bird population (as a guide, more than 15 large birds or 30 small birds) in locations that represent an increased potential for strike. A single bird in a critical location may cause a severe BWC.

Block Time.—Time determined by the scheduling agency responsible for mission accomplishment for the aircraft to arrive at (block in) or depart from (block out) the parking spot.

Blue Bark.—US military personnel, US citizen civilian employees of the Department of Defense (DoD), and the dependents of both categories who travel in connection with the death of an immediate family member. It also applies to designated escorts for dependents of deceased military members. Furthermore, the term is used to designated property shipment of a deceased member.

Border Clearance.—Those clearances and inspections required to comply with federal, state, and local agricultural, customs, immigration, and immunizations requirements.

Category I Route.—Any route that does not meet the requirements of a category II route, including tactical navigation and overwater routes.

Category II Route.—Any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (NDB, VOR, TACAN) at least once each hour with positive course guidance between such radio aids.

Chalk Number.—Number given to a complete load and to the transporting carrier.

Charge Medical Technician (CMT).—A qualified AET who supervises other AETs in aircrew positions on an AE mission.

Circular Error Average (CEA).—Indicator of the accuracy of an airdrop operation. It is the radius of a circle within which half of the airdropped personnel and items or materiel have fallen.

Circular Error Record (Individual).—Maintained for all navigators who are airdrop qualified. See AFI 11-231.

Coin Assist.—Nickname used to designate dependent spouses accompanying dependent children and dependent parents of military personnel reported missing or captured who may travel space available on military aircraft for humanitarian purposes on approval of the Chief of Staff, United States Army; Chief of Staff, United States Air Force; Chief of Naval Operations; or the Commandant of the Marine Corps.

Combat Control Team (CCT).—A small task organized team of Air force parachute and combat diver qualified personnel trained and equipped to rapidly establish and control drop, landing, and extraction zone air traffic in austere or hostile conditions. They survey and establish terminal airheads as well as provide guidance to aircraft for airlift operation. They provide command and control, and conduct reconnaissance, surveillance, and survey assessments of potential objective airfields or assault zones. They also can perform limited weather observations and removal of obstacles or unexploded ordinance with demolitions. Also called CCT.

Command and Control (C2). —The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through an arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission. Also called C2.

Command and Control Center (CC) (C2).—Each CC provides supervision, guidance, and control within its assigned area of responsibility. For the purpose of this AFI, CCs include operations centers, command posts, air mobility elements, tanker airlift control elements (TALCE), air mobility control centers, and tanker task forces.

Command and Control Information Processing System (C2IPS).—Computer-based information transmission and information handling for command and control functions associated with the Director of Mobility Forces (DIRMOBFOR), AME fixed units, and TALCE. Interfaces to and automatically updates the Global Decision Support System (GDSS).

Conference SKYHOOK.—Communication conference available to help aircrews solve inflight problems that require additional expertise.

Contingency Mission.—Mission operated in direct support of an OPORD, OPLAN, disaster, or emergency.

Critical Phase Of Flight.—Takeoff, low level (below MSA), airdrop, approach, and landing.

Deadhead Time.—Duty time for crewmembers positioning or de-positioning for a mission or mission support function and not performing crew duties.

Designated Courier.—Officer or enlisted member in the grade of E-5 or above of the US Armed Forces, or a Department of State diplomatic courier, selected by the Defense Courier Service (DCS) to accept, safeguard, and deliver DCS material as directed. A primary aircrew member should be used as a courier only as a last resort.

Desolate Terrain Missions.—Any mission in excess of one hour over desert, tropical, or jungle terrain (not to include flights conducted over the CONUS).

Deviation.—A deviation occurs when takeoff time is not within -20/+14 minutes of scheduled takeoff time.

Direct Instructor Supervision.—Supervision by an instructor of like specialty with immediate access to controls (for pilots, the instructor must occupy either the pilot or copilot seat).

Director, Mobility Forces (DIRMOBFOR).—In overseas theaters, the DIRMOBFOR is normally responsible for theater mobility force management. The Air Force component commander exercises operational control of assigned or attached mobility forces through the DIRMOBFOR. The DIRMOBFOR monitors and manages assigned mobility forces operating in theater.

Distinguished Visitor (DV).—Passengers, including those of friendly nations, of star or flag rank or equivalent status to include diplomats, cabinet members, members of Congress, and other individuals designated by the DoD due to their mission or position (includes BLUE BARK and COIN ASSIST).

Double Blocking.—When an aircraft is required to block-in at one parking spot, then move to normal parking for final block-in. The extra time required for double blocking will be taken into account during mission planning/scheduling. To compensate for double blocking on departure, the aircrew "legal for alert time" may be adjusted to provide additional time from aircrew "show time" to departure. When double blocking is required on arrival, the aircrews entry into crew rest will be delayed until postflight duties are complete.

Drop Zone (DZ).—A specified area upon which airborne troops, equipment, or supplies are airdropped.

Due Regard.—Operational situations that do not lend themselves to International Civil Aviation Organization (ICAO) flight procedures, such as military contingencies, classified missions, politically sensitive missions, or training activities. Flight under "Due Regard" obligates the military aircraft commander to be his or her own air traffic control (ATC) agency and to separate his or her aircraft from all other air traffic. (See FLIP General Planning, section 7.)

DZ Entry Point.—A fixed point on DZ run-in course where an aircraft or formation of aircraft may safely begin descent from IFR en route altitude to IFR drop altitude. The DZ entry point is a maximum of 40 NM prior to the DZ exit point according to Federal Aviation Administration FAR exemption 4371C. Formation descent will not begin until the last aircraft in formation is at or past the DZ entry point.

DZ Exit Point.—A fixed point on the DZ escape flight path centerline, established during pre-mission planning, at which the formation will be at the minimum IFR en route altitude. Calculate the exit point based upon three-engine performance at airdrop gross weight. This point will be planned no less than four NMs track distance beyond the DZ trailing edge.

Earliest Descent Point (EDP).—Earliest point in the DZ run-in course where the lead aircraft may begin IFR descent to IFR drop altitude and be assured of terrain clearance for the entire formation. Compute EDP by subtracting formation length from the computed DZ entry point.

Equal Time Point.—Point along a route at which an aircraft may either proceed to destination or first suitable airport or return to departure base or last suitable airport in the same amount of time based on all engines operating.

Estimated Time In Commission—(ETIC). Estimated time required to complete required maintenance.

Execution.—Command-level approval for initiation of a mission or portion thereof after due consideration of all pertinent factors. Execution authority is restricted to designated command authority.

Familiar Field.—An airport in the local flying area at which unit assigned aircraft routinely perform transition training. Each operations group commander will designate familiar fields within their local flying area.

Firm Scheduled Return Time (FSRT).—Scheduling tool used by air mobility units to predict when crews will return to home station. FSRT for active duty, ANG, and AFRC is defined as SRT plus 24 hours.

First Suitable Airfield (FSAF).—The first suitable airfield available after completing the Category I route segment.

Fix.—A position determined from terrestrial, electronic, or astronomical data.

Forced Rendezvous Point (FRP).—Navigational checkpoint over which formations of aircraft join and become part of the main force.

Global Decision Support System (GDSS).—AMC's primary execution command and control system. GDSS is used to manage the execution of AMC airlift and tanker missions.

Global Patient Movement Requirements Center (GPMRC).—A joint activity reporting directly to the Commander in Chief, US Transportation Command, the Department of Defense single manager for the regulation of movement of uniformed services patients. The Global Patient Movement Requirements Center authorizes transfers to medical treatment facilities of the Military Departments or the Department of Veterans Affairs and coordinates intertheater and inside continental United States patient movement requirements with the appropriate transportation component commands of US Transportation Command.

Ground Time.—Interval between engine shut down (or arrival in the blocks if engine shutdown is not scheduled) and next takeoff time.

Hazardous Cargo or Materials (HAZMAT).—Articles or substances that are capable of posing significant risk to health, safety, or property when transported by air and classified as explosive (class 1), compressed gas (class 2), flammable liquid (class 3), flammable solid (class 4), oxidizer and organic peroxide (class 5), poison and infectious substances (class 6), radioactive material (class 7), corrosive material (class 8), or miscellaneous dangerous goods (class 9). Classes may be subdivided into divisions to further identify hazard (i.e., 1.1, 2.3, 6.1, etc.).

In-Place Time (IPT).—Time when an aircraft and crew are at an operating base and prepared to load for the mission.

Instructor Supervision.—Supervision by an instructor of like specialty (see also Direct Instructor Supervision).

Interfly.—The exchange and/or substitution of aircrews and aircraft between Mobility Air Forces (MAF) including crewmembers and/or aircraft from AETC, ACC, PACAF, USAFE and AMC-gained ANG and AFRC forces.

Joint Airborne/Air Transportability Training (JA/ATT).—Continuation and proficiency combat airlift training conducted in support of DoD agencies. Includes aircraft load training and service school support. HQ AMC publishes JA/ATT tasking in AMC OPORD 17-76, annex C, appendix 1.

Jumpmaster.—The assigned airborne-qualified individual who controls parachutists from the time they enter the aircraft until they exit.

Knock-it-Off.—A term any crew member may call to terminate a training maneuver. Upon hearing “knock-it-off” the crew should establish a safe attitude, altitude and airspeed and return the aircraft power and flight controls to a normal configuration.

Last Suitable Airfield (LSAF).—The last suitable airfield available before beginning the Category I route segment.

Latest Descent Point.—Latest planned point on the DZ run-in course where the formation plans to initiate descent to drop altitude. This is planned to ensure all aircraft in the formation are stabilized (on altitude and airspeed) prior to the drop.

L-Band SATCOM.—600 BPS satellite communications (SATCOM) system contracted through the International Maritime Satellite Organization (INMARSAT), used primarily for command and control. The system consists of a satellite transceiver, a laptop computer, and a printer.

Lead Crew.—A crew consisting of a lead qualified aircraft commander and a lead qualified navigator.

Loading Time.—In airlift operations, a specified tie, established jointly by the airlift and airborne commanders concerned, when aircraft and loads are available and loading is to begin.

Local Training Mission.—A mission scheduled to originate and terminate at home station (or an off-station training mission), generated for training or evaluation and executed at the local level.

Maintenance Status:—

- **A-1;** No maintenance required.
- **A-2 (Plus Noun);** Minor maintenance required, but not serious enough to cause delay. Add nouns that identify the affected units or systems, i.e. hydraulic, ultra high frequency (UHF) radio, radar, engine, fuel control, generator, etc. Attempt to describe the nature of the system malfunction to the extent that appropriate maintenance personnel will be available to meet the aircraft. When possible, identify system as mission essential (ME) or mission contributing (MC).
- **A-3 (Plus Noun);** Major maintenance. Delay is anticipated. Affected units or systems are to be identified as in A-2 status above.
- **A-4;** Aircraft or system has suspected or known biological, chemical, or radiological contamination.

Medical Crew Director (MCD).—A qualified Flight Nurse (FN) responsible for supervising patient care and AECMs assigned to AE missions. On missions where an FN is not onboard, the senior AET will function as MCD.

Mission.—1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefor. 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. 3. The dispatching of one or more aircraft to accomplish one particular task.

Mission Advisory.—Message dispatched by command and control agencies, liaison officers, or aircraft commanders advising all interested agencies of any changes in status affecting the mission.

Mission Contributing (MC).—Any degraded component, system, or subsystem which is desired, but not essential to mission accomplishment.

Mission Essential (ME).—An degraded component, system, or subsystem which is essential for safe aircraft operation or mission completion.

Mobility Air Force (MAF).—Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

Modified Contour.—Flight in reference to base altitude above the terrain with momentary deviations above and below the base altitude for terrain depressions and obstructions to permit a smooth flight profile.

Most Probable Position (MPP).—An MPP is a position determined with partial reference to a DR position and partial reference to all other fixing aids, weighing each one according to the navigator's judgment and experience.

Off Station Training Flight.—A training flight that originates or terminates at other than home station that is specifically generated to provide the aircrew experience in operating away from home station. Off station trainers will not be generated solely to transport passengers, cargo, or position/deposition crewmembers.

Operational Control (OPCON).—Transferable command authority that may be exercised by commanders at any echelon at or bellow the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training. Also called OPCON.

Operational Missions.—Missions executed at or above TACC level. Operational missions termed "CLOSE WATCH" include CORONET missions and priority 1, 2, and 3 missions tasked by the TACC. Other operational missions such as deployment, re-deployment, reconnaissance operations, operational readiness inspections (ORI), AMC-directed channel or SAAM, and JA/ATT missions may be designated "CLOSE WATCH" as necessary.

Opportune Airlift.—Transportation of personnel, cargo, or both aboard aircraft with no expenditure of additional flying hours to support the airlift.

Originating Station.—Base from which an aircraft starts on an assigned mission. May or may not be the home station of the aircraft.

Operational Risk Management (ORM).—A logic-based, common sense approach to making calculated decisions on human, materiel, and environmental factors before, during, and after Air Force operations. It enables commanders, functional managers and supervisors to maximize operational capabilities while minimizing risks by applying a simple, systematic process appropriate for all personnel and Air Force functions.

Overwater Flight.—Any flight that exceeds power off gliding distance from land.

Patient Movement Categories.—

Urgent. —Patients who must be moved immediately to save life, limb, or eyesight, or to prevent complication of a serious illness.

Priority.—Patients requiring prompt medical care that must be moved within 24 hours.

Routine. —Patients who should be picked up within 72 hours and moved on routine/scheduled flights.

Permit to Proceed.—Aircraft not cleared at the first US port of entry may move to another US airport on a permit to proceed issued by customs officials at the first port of entry. This permit lists the requirements to be met at the next point of landing, i.e. number of crew and passengers, cargo not yet cleared. Aircraft commanders are responsible to deliver the permit to proceed to the customs inspector at the base where final clearance is performed. (Heavy monetary fines can be imposed on the aircraft commander for not complying with permit to proceed procedures.)

Point Of No Return.—A point along an aircraft track beyond which its endurance will not permit return to its own or some other associated base on its own fuel supply.

Point of Safe Return.—Most distant point along the planned route from which an aircraft may safely return to its point of departure or alternate airport with required fuel reserve.

Positioning and De-Positioning Missions.—Positioning missions are performed to relocate aircraft for the purpose of conducting a mission. De-positioning missions are made to return aircraft from bases at which missions have terminated.

Quick Stop.—Set of procedures designed to expedite the movement of selected missions by reducing ground times at enroute or turnaround stations.

Ramp Coordinator.—Designated representative of the C2 whose primary duty is the coordination of ground handling activities on the ramp during large scale operations.

Scheduled Return Date (SRD).—Scheduling tool used by air mobility units to predict when crews will return to home station. It allows force managers to plan aircrew availability and provide crews visibility over monthly flying activities. AMC and AMC-gained aircrews (except those on standby at home station) will have an SRT established on their flight orders.

Scheduled Takeoff Time.—Takeoff time is established in the schedule or OPORD. For air aborts and diversions, this will be engine shut down time (or arrival in the blocks if engine shutdown is not scheduled) plus authorized ground time. Early deviation does not apply to aborts or diversions unless the mission is formally rescheduled by current operations.

Section.—Subdivision of a formation. A section normally consists of 6 aircraft (2 elements).

Serial.—Normally consists of 12 aircraft (2 sections or 4 elements).

Significant Meteorological Information (SIGMET).—Area weather advisory issued by an ICAO meteorological office relayed to and broadcast by the applicable ATC agency. SIGMET advisories are issued for tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, severe and extreme turbulence, severe icing, and widespread dust or sand storms. SIGMETs frequently cover a large geographical area and vertical thickness. They are prepared for general aviation and may not consider aircraft type or capability.

Special Assignment Airlift Mission (SAAM).—Funded airlift that cannot be supported by channel missions because of the unusual nature, sensitivity, or urgency of the cargo, or that requires operations to points other than the established channel structure.

Special Tactics Team (STT).—An Air Force team composed primarily of special operations combat control and pararescue personnel. The team supports joint special operations by selecting, surveying, and establishing assault zones; providing assault zone terminal guidance and air traffic control; conducting direct action missions; providing medical care and evacuation; and coordinating, planning, and conducting air, ground, and naval fire support operations personnel organized, trained, and equipped to establish and operate navigational or terminal guidance aids, communications, and aircraft control facilities in support of combat aerial delivery operations.

Stabilization Point.—Point on the DZ run-in course at which the lead aircraft should plan to be stabilized at drop altitude and airspeed. This point will be planned to be at least 6 NMs prior to the point of impact.

Station Time.—In air transport operations, the time at which crews, passengers, and cargo are to be on board and ready for the flight.

Suitable Airfield.—Normally, suitable airfields are those which meet C-130 weather, fuel, and runway requirements (**Chapter 6**) and are within 50 NM of flight plan course centerline.

Supplemental Training Mission (STM).—Opportune airlift of cargo and mission personnel may be accomplished as a by-product of crew training missions. STMs may be authorized when minor adjustments can be made to a scheduled training mission or when a productive aircrew training mission can be generated for the airlift. The training mission will not be degraded in any manner to accomplish the STM. Use of STMs for logistical support will be authorized only when normal military or commercial transportation modes are unable to provide required support. STMs may be approved by the operations group commander. On STMs aircraft commanders will release maximum number of space available seats commensurate with mission requirements and safety.

Tactical Event.—Airdrop, low level, formation, and threat avoidance approaches/departures.

Tanker Airlift Control Center (TACC).—The Air Mobility Command direct reporting unit responsible for tasking and controlling operational missions for all activities involving forces supporting US Transportation Command's global air mobility mission. The Tanker Airlift Control Center is comprised of the following functions: current operations, command and control, logistics operations, aerial port operations, aeromedical evacuation, flight planning, diplomatic clearances, weather, and intelligence. Also call TACC.

Tanker Airlift Control Element (TALCE).—Team of qualified Air Force personnel established to control, coordinate, and function as an Air Force tanker and airlift C2 facility at a base where normal

AMC C2 facilities are not established or require augmentation. TALCEs support and control contingency operations on both a planned and no-notice basis.

Terminal Fuel Flow (TFF).—The fuel flow rate expected during the last hour at cruise altitude. It is the difference between the fuel required for enroute time plus one hour and fuel required for enroute time. TFF may also be computed using the T.O. 1C-130X-1-1 fuel flow table and the estimated aircraft weight at destination. Estimated gross weight is determined by subtracting fuel burn off from takeoff gross weight.

Theater Patient Movement Requirements Center (TPMRC).—Responsible for the coordination and requirements for patient movement from communication zone (COMMZ) to CONUS.

Time Out.—Common assertive statement used to voice crewmember concern when safety may be jeopardized.

Training Mission.—Mission executed at the unit level for the sole purpose of aircrew training for upgrade or proficiency. Does not include operational missions as defined in this AFI.

Transportation Working Capital Fund (TWCF).—Formerly known as Defense Business Operations Fund-Transportation (DBOF-T). TWCF is part of the Air Force Working Capital Fund (AFWCF). Normally, TWCF funds are used for costs that can be recovered from an air mobility customer. Examples include: TDY costs, site surveys of TALCE or airlift unit deployment beddown locations, airlift unit level mission planning expenses, and support or contract costs for deployed TWCF units/personnel.

Unilateral.—Operations confined to a single service.

Unit Move.—A mission airlifting military passengers or troops who originate from the same unit and onload point, are under the control of a designated troop commander and offload at the same destination.

Zero Fuel Weight.—Weight, expressed in pounds, of a loaded aircraft not including wing and body tank fuel. All weight in excess of the maximum zero fuel weight will consist of usable fuel.

Attachment 2

AF FORM 4108, C-130 FUEL LOG INSTRUCTIONS

A2.1. General. The following instructions standardize procedures for the completion and disposition of AF Form 4108. The purpose of the form is to provide an orderly method of recording fuel consumption and aircraft gross weight.

A2.1.1. The AF Form 4108 will be completed whenever the navigator completes AF Form 4052, **Range Control Chart** or AF Form 4116, **C-13O Flight Plan and Record**. The log maybe filled out as necessary to accomplish training or corrective action.

A2.1.2. When the fuel log is completed, it is not required to fill out the reverse side of the AF Form 4063, **Mini C-130 TOLD Card**.

A2.2. Responsibility:

A2.2.1. The flight engineer will complete the AF Form 4108.

A2.2.2. Return completed forms to the unit of the individual completing the form. The squadron flight engineer supervisor will maintain completed forms for 6 months.

A2.3. Additional Information. AF Form 4108 provides as a simple method of recording aircraft fuel data and is adequate for normal operational requirements. When additional information is required for identifying trends in engine failure or performance or for special test programs, the directing headquarters will furnish necessary forms and instructions to complete the program.

A2.4. Instructions. Form heading entries are self-explanatory.

A2.4.1. Block 1-FUEL GAGE POUNDS. Record fuel quantity from the fuel quantity indicators before and after flight. This reading is normally taken prior to engine start with the indicators powered and after flight prior to power being removed from the indicators.

A2.4.2. Block 2-WEIGHT DATA. Record operating weight and cargo weight (including passenger weight) from DD Form 365-4. Ramp fuel weight is obtained from block 1 (Fuel Gage). The blank space may be used for last minute changes prior to engine start or as required.

A2.4.3. Block 3-FUEL ON/OFFLOAD. Enter total weight of fuel on or offload during air refueling in this block.

A2.4.4. Block 4-PAX/CARGO OFFLOAD. Enter total weight of passengers and cargo extracted during flight in this block.

A2.4.5. Block 5-ENGINE START Z. Enter Greenwich mean time (GMT) of last engine started.

A2.4.6. Block 6-COND. Enter symbol depicting flight condition as follows:

A2.4.6.1. WU/TAXI/TAKEOFF-Indicates warm-up taxi and takeoff conditions.

A2.4.6.2. 1➚Climb. Initial climb is indicated by symbol (1➚). Secondary and subsequent climbs are shown as (2➚, 3➚, etc.). The number here indicates sequence of condition in flight profile. This is also true of cruise segments and descents. Climbs of 4,000 feet or less will not be recorded separately but will be included in preceding cruise increments. When constant climb is maintained to cruise altitude, use fuel flow reading taken at 2/3 climb altitude. When constant climb cannot be maintained to cruise altitude due to air route traffic control (ARTC) clearances, etc., enter difference between sum of individual fuel quantity gage readings at beginning and end of climb.

A2.4.6.3. Cruise operating conditions are indicated by the number in cruise sequence and an arrow (1→, 2→, 3→, etc.). Instrument readings will be averaged for this period. Normally, cruise entries will be no more than 1 hour. However, the first cruise, the cruise immediately prior to en route or step climb and/or the last cruise prior to descent, may be no less than 30 minutes, nor more than 1 hour and 30 minutes.

A2.4.6.4. Descents are shown as (1↘, 2↘, 3↘, etc.). Do not confuse descent with the final letdown that occurs when your landing procedures begin. The loss in altitude during final letdown is indicated by "L & T." Landing and taxi is that condition from the end of the last entry in the sequence of descents to engine shutdown on the ramp. Holding time, however, must he accounted for as an additional cruise (→) condition after descent when necessary. Descents of 4,000 feet or less will not be recorded separately but will be indicated in the preceding cruise increment. When descent exceeds 4,000 feet, blocks 10 through 18 need not be completed.

A2.4.6.5. AR-Air Refueling Tanker Operation, ARR Air Refueling Receiver Operation. Cruise, climb, or descent to refueling altitude (end this condition approximately at start of on/offload of fuel.) Indicate AR and ARR 1, 2, etc., in condition block, for refueling condition. Blocks 10 through 18 need not be completed. Blocks 19, 20, 22, 25, and 28 entries are not required for ARR. At completion of on or offload of fuel, a new cruise, climb, or descent condition will be initiated. ***NOTE*:** Rescue. search, storm penetration, combat/combat support, or any special mission which requires constant variations in altitude and airspeed may use the same procedures as air refueling operations. For this type of condition use an "S" in the condition block.

A2.4.7. Block 7-END. Enter GMT for end of condition.

A2.4.8. Block 8-SET. Enter increment time duration for the condition for WU/TAX/TO. All warm-up and taxi times will be entered in the circle of the SET block. Takeoff time is computed from brake release to the first change of power (when reduced power procedures are used, compute take-off time using 2 minutes).

A2.4.9. Block 9-TOTAL. Enter cumulative total time of SET time, excluding the warm-up and taxi times entered in the circle SET time.

A2.4.10. Block 10-OATI. Enter indicated outside air temperature reading.

A2.4.11. Block 11-OAT/VAR:

A2.4.11.1. OATC. Enter corrected outside air temperature as determined from the appropriate performance manual.

A2.4.11.2. VAR. Enter temperature variation from standard International Civil Aviation (ICAO) temperature.

A2.4.12. Block 12-HP. Enter the pressure altitude for the condition with altimeter set at 29.92 Hg.

A2.4.12.1. For climb, enter HP for 2/3 the intended climb as soon as the altitude to which the climb is to be made is known. The entry (2/3 HP) reflects pressure altitude for 2/3 of the actual climb. If a climb starts at 15.000 feet and terminates at 30,000 feet, you compute the pressure altitude for 2/3 of the 15,000 difference, which is 10,000 feet. This HP added to the 15,000 foot beginning HP equals 25,000 feet HP, which is the appropriate entry for this climb.

A2.4.12.2. For cruise, enter the actual HP.

A2.4.12.3. When descent exceeds 4,000 feet, blocks 10 through 18 need not be completed.

A2.4.13. Block 13-CRUISE CEILING. Enter 4-engine cruise ceiling for the aircraft from the appropriate performance manual.

A2.4.14. Block 14-CRUISE IAS. Enter indicated airspeed from the appropriate performance manual required to maintain desired true airspeed.

A2.4.15. Block 15-TORQUE. Enter torque value from the appropriate performance manual required to maintain the desired true airspeed.

A2.4.16. Block 16-3-ENGINE SERVICE CEILING. Enter 3-engine service ceiling from the appropriate performance manual.

A2.4.17. Block 17-3-ENGINE DRIFTDOWN IAS. Enter the 3-engine driftdown indicated airspeed from the appropriate performance manual.

A2.4.18. Block l8-ENGINE INST F/F LBS/HR. Enter the average individual fuel flow reading and total for the period. Engine instrument fuel flow (lbs/hr) will be the complete figure (4800 not 4.8).

A2.4.19. Block 19-PERIOD (FUEL USED). Enter fuel used for engines for the period as computed using total of fuel flow readings. ***NOTE***: For fuel used during WU/TAXI, use 50 pounds per minute. For fuel used during TAKEOFF, use 300 pounds. Enter all fuel used, fuel remaining, and gross weights in thousands. ***EXAMPLE:*** 127,300 = 127.3. All weights are to be carried to the nearest hundred. ***EXCEPTION:*** Engine instrument fuel flow (lbs/hr) will be a complete figure.

A2.4.20. Block 20-EXTRA (FUEL USED). Enter extra fuel used during flight condition period for fuel jettisoning, APU, etc. Fuel transferred to a receiver during air refueling will be entered in this block.

A2.4.21. Block 21-TOTAL (FUEL USED). Enter cumulative total of fuel used for successive conditions. This block represents all fuel consumed to END clock time entered in block 7. ARR (receiver) start new condition (cruise, climb, or descent) after refueling with "O" (zero) fuel used.

A2.4.22. Block 22-PERIOD (CALC FUEL REMAINING). Enter the amount of fuel consumed (block 19 plus block 20) for flight condition as determined by calculation.

A2.4.23. Block 23-TOTAL (CALC REMAINING). Enter the total amount of the calculated fuel remaining by subtracting the amount in block 22 from the amount of calculated fuel remaining at END clock time entered in block 7. ARR (receiver) condition. Enter cumulative total of fuel (indicated by individual gage readings) on board airplane after refueling.

A2.4.24. Block 24-This block is unlabeled to facilitate entering the total ramp fuel from block 2, WEIGHT DATA. Enter the ramp calculated fuel aboard, obtained by either measurement with a dipstick and applying any known correction factor or as indicated by total of fuel quantity indicators. On reverse side of form, this block is used to carry forward previous quantity from front side of form.

A2.4.25. Block 25-GAGE PERIOD (GAGE FUEL REMAINING). Enter the period fuel used for flight condition as determined by the fuel gage readings for present condition compared to the fuel gage reading for previous condition. For fuel used during WU/TAXI, use 50 pounds per minute. For fuel used during TAKEOFF, use 300 lbs.

A2.4.26. Block 26-TOTAL (GAGE TOTAL). Enter total of fuel as indicated by the individual quantity gages. ARR (receiver) condition. Enter cumulative total of fuel (individual gage readings) onboard airplane after refueling.

A2.4.27. Block 27-This block is unlabeled to facilitate entering total ramp fuel from Block 2. WEIGHT DATA. Enter the ramp calculated fuel aboard obtained by either measurement with the dipstick and applying any known correction factor or as indicated by the total of fuel quantity indicators. On reverse side of the form this block is used to carry forward previous quantity from the front side of the form.

A2.4.28. Block 28-FUEL USED. Enter the fuel used from total of blocks 19 and 20.

A2.4.29. Block 29-ON/OFFLOAD. After the aerial delivery of troops or equipment or after aerial refueling, enter the weight loss or gain to properly indicate actual gross weight of airplane in block 30.

A2.4.30. Block 30-END GROSS WEIGHT. Enter the aircraft gross weight at end of period. This weight is found by subtracting fuel used for this period (Block 21) from previous ending gross weight. If entry was made in block 29 (ON/OFFLOAD), this weight must also be added or subtracted from the previous ending gross weight to arrive at correct END GROSS WEIGHT figure.

A2.4.31. Block 31. This block is unlabeled to facilitate entering total ramp gross weight from Block 2. WEIGHT DATA. On reverse side of form, this block is used to carry forward previous weight from the front side of form.

A2.4.32. Block 32-REMARKS. Enter any remarks or observations, including instrument readings pertinent to flight, which you feel noteworthy.